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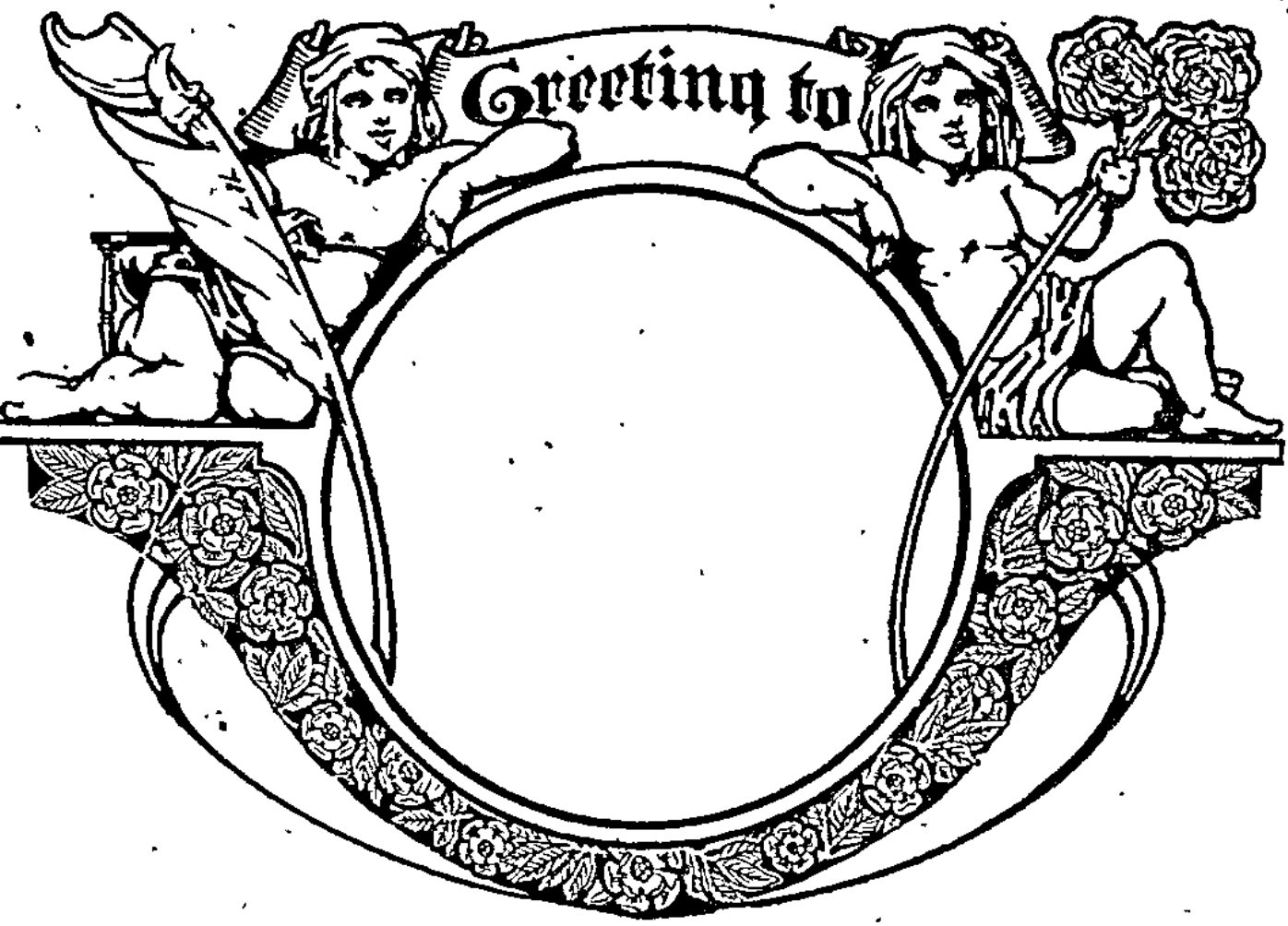
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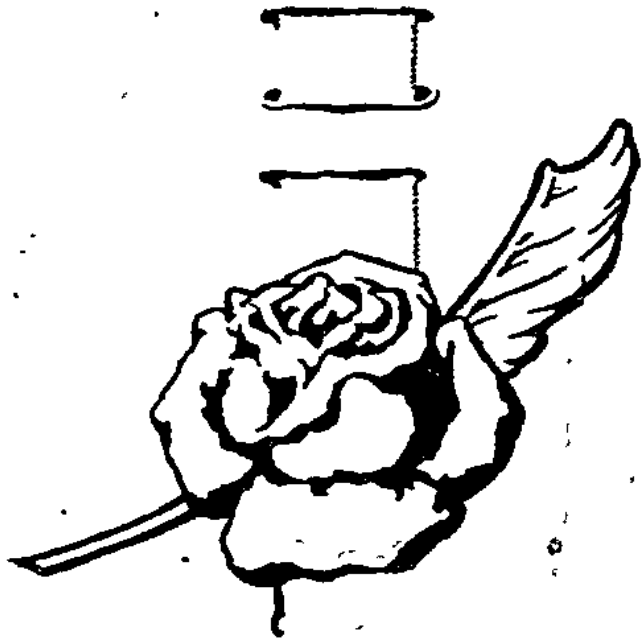
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*** *The Editor regrets that it was impossible to make use of all the photographs he received, but a number of those which are left over will be used in next year's volume, further photographs for which will be welcomed.*

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THE EDITOR'S FOREWORDS.



Design and Block by
Archibald & Fowler

THERE is little that is new to say in introducing this, the eleventh volume of the PROCESS YEAR BOOK. Our readers will judge for themselves its contents without prompting on our part, and they, perhaps, can decide whether on the whole photo-mechanical processes have advanced in the past year. For our part we find it difficult to determine whether any decided advance is to be recorded. The half-tone process would seem to be as good as it well can be, and almost every conceivable change has been rung on the process by the employment of a second printing. Many examples of such work are given in this book, perhaps the most notable being those in which the Metzograph screen is employed for one of the blocks.

The Metzograph screen is very much in evidence in this year's issue, showing that it is now better understood, and its possibilities more perfectly realized. The series of examples made with varying degrees of fineness of grain by the eminent Viennese photo-engraving firm, C. Angerer & Göschl, who have brought the screen into everyday use, show that this screen will render detail, tone and gradation most perfectly, and at the present time, when the public is somewhat surfeited with ruled screen half-tone, the natural texture of the Metzograph grain comes as a welcome change.

In colour work there is a general improvement all along the line, but we cannot now speak of *three*-colour in the sense of embracing all photographic colour processes, now that four-colour work is coming so greatly into vogue, many practical workers holding that four-colour must be eventually a universal adoption.

Whilst we cannot ourselves subscribe to that which seems to be a heresy in the light of all scientific thought, we must confess that an examination of much of the three-colour work of to-day gives one the feeling of something wanting. This, however, is only due, we think, to the still imperfect means at our disposal for interpreting the varied hues of nature by means of three printings, and the result of further research will point the way to the fullest realization of one of the most beautiful and most wonderful ideas evolved by science and made possible by the kindred arts of photography and printing.

Whilst we can admire the results and commend the patient investigation which has led Mr. C. G. Zander (a most consistent advocate of purely three-colour printing in past volumes of the PROCESS YEAR BOOK) to now advocate four printings we cannot admit its necessity. It is true that the method he is advocating is a very different matter from that of merely adding a fourth black or gray print to a three-colour set, and the brightness of the colours he obtains together with a true black is a strong argument in favour of his process, but we cannot agree that it is destined to supersede the older process. The trichromatic process is too firmly rooted on fundamentally correct principles to be so easily set aside Mr. Zander's process may be valuable for the moment to printers and process workers, but in our opinion it can only be the stepping stone to the ultimate triumph of the three-colour theory.

We would also draw the attention of our readers to the frontispiece of our volume, which is printed from an intaglio-engraved copper surface at a high rate

of speed on a power press. This process, which has so long been successfully worked by an English firm who have held their methods a close secret, seems to have been mastered by the eminent engraving and printing house of F. Bruckmann, Munich, and introduced under the name of Mezzotinto-gravure.

One other process which has been perfected during the year, deserves special mention, viz., the Sears' High-light Lithographic Process, a good example of which is given in the reproduction of the pencil drawing of Sir Charles Wyndham as "David Garrick." When it is considered that this result is attained by means of a 200-line screen grain, and yet can be printed on drawing paper with an ordinary lithographic machine, at a speed of 800 per hour, retaining all the delicate touches and rubbings of the artist's pencil, it must be regarded as a remarkable achievement. We have seen other applications of this process which rival collotype and almost equal photogravure.

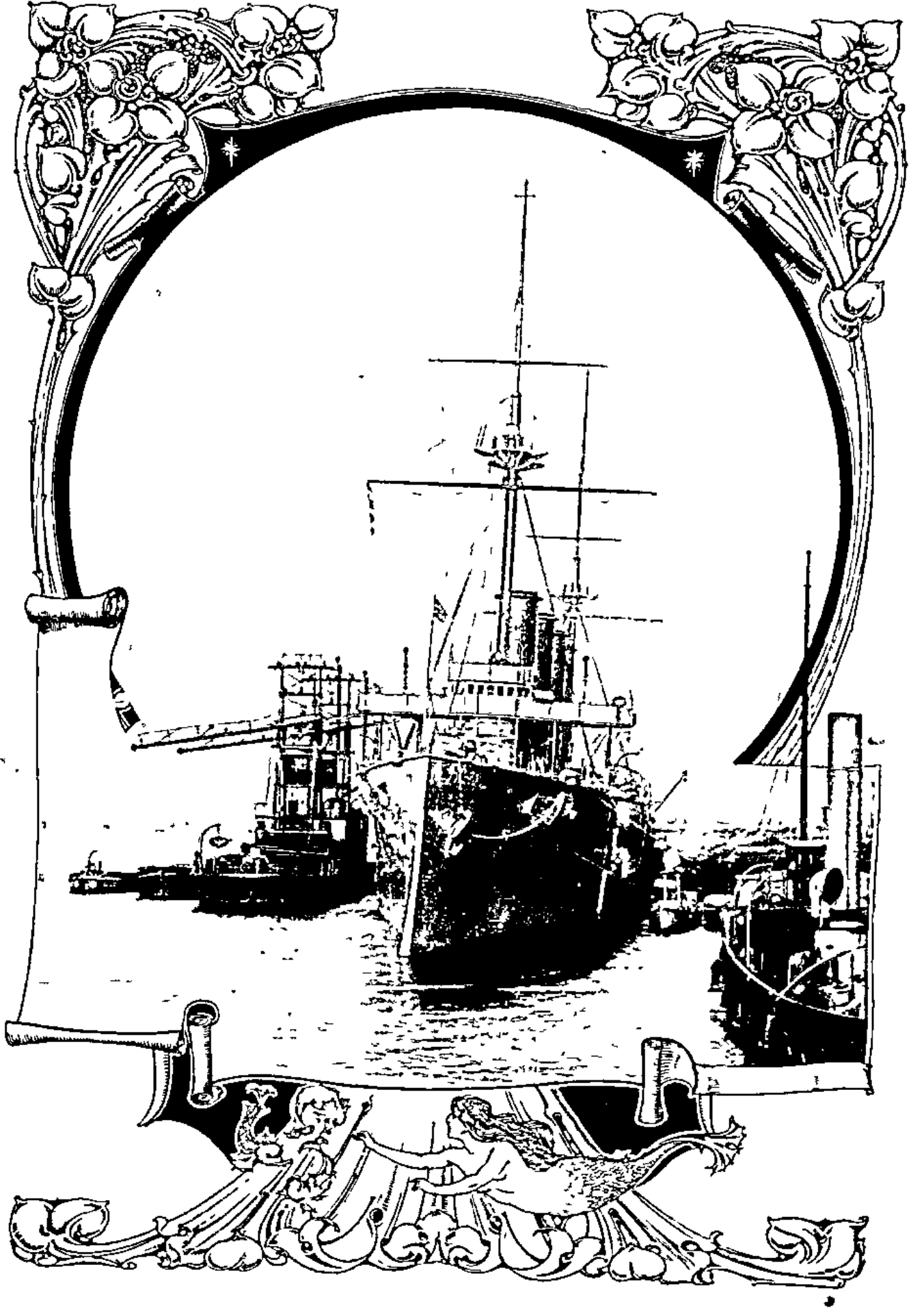
What shall we say of progress in 1905? We mean that progress which is not merely commercial, but that which comes of research, of invention, of patient study and advancing technical education.

There can be no doubt that the ever-increasing stress of competition is destructive of experimental effort in the workshops, the constant lowering of prices making it imperative that only those methods should be worked which yield immediate and rapid financial return, by reason of the facility gained by long practice. Further, the tendency of competition is to make businesses imitative. What one firm has found successful another firm adopts and competes with by cutting prices. Thus originality is lacking and the processes become degraded to merely mechanical money-grubbing methods. There is no encouragement for a man to put forth his highest effort, to give to the world work that will live for all time, like the productions of the old masters in various arts and crafts.

Better methods are not likely in these days to come out of the workshops and we must look more and more to our technical schools and to private research for improvements in process methods, which will eventually find their way into the workshops through the accession of young blood nurtured in the schools. A higher type of workman is being developed who will eventually make progress in his business, despite the decadent influences which surround him. We have great faith in the future of process work, and we look forward to still greater accomplishments than even our present volume shows.



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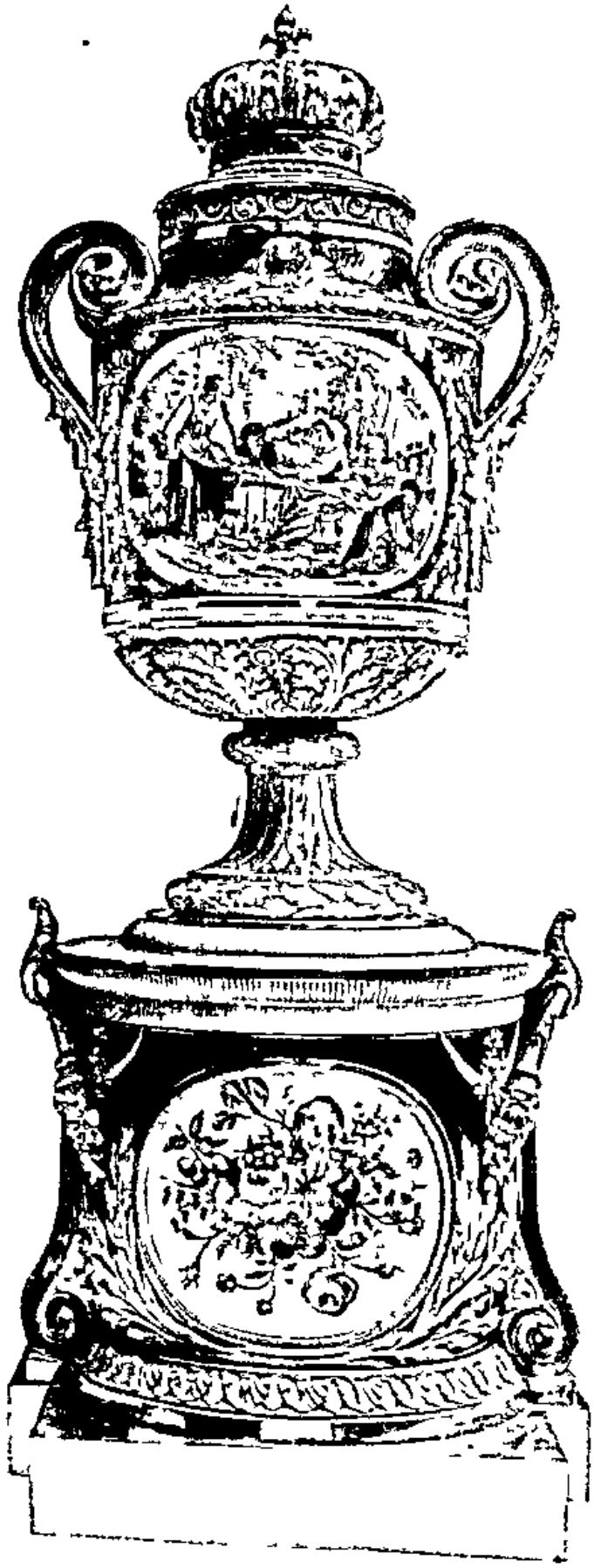
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EXAMPLE OF SEVRES PORCELAIN AT HERTFORD HOUSE.

Illustration from "French Porcelain" by Geniest



JUNE IN THE AUSTRIAN TYROL.

By J. Mc Whirter, R.A.

From the Picture in the National Gallery of British Art

Reproduced by the "Ardsleigh" direct Color Process

André & Sleigh, Ltd., Bushey, Herts.



"TISSINGTON SPIRES."

From a Photograph by W C Keene of Derby

"Andaleigh" process

André & Sleigh, Ltd.,
Bushey, Herts

A FIELD NEGLECTED BY EUROPEAN PHOTO-ENGRAVERS.

By THE EDITOR.



Design and Block by
STUDENTS OF THE
BOLT COURT SCHOOL

THE half-tone illustrated catalogue and the artistic booklet are a great advertising power in American business life, and the American photo-engraver naturally follows the demand for this commercial publicity, with the result that American manufacturers and wholesalers have become the best customers of the photo-engraving industry.

Large staffs are employed in the preparation of the originals for this class of work, and in many cases it would appear that there are more people engaged in this preparatory work than in the making of the actual photo-engravings. Outdoor photographers are usually ready in connection with most of the big photo-engraving firms to go in response to a telephone call to a manufacturer's place and photograph any new goods.

The difficulties, however, of successfully photographing commercial objects to the best advantage amidst the surroundings of the factory or dry goods store are so great that photo-engraving firms have been led to make elaborate provision for dealing with this kind of work on their own premises. In Chicago some of the large firms have goods lifts which are capable of taking up even a waggon or a motor car to the photographic studio. The latter is invariably situated on the roof of a sky-scraper, more often than not from twelve to fifteen floors up from the street.

The studios are usually provided with immense sky-lights, enabling the photographic work to be done by daylight, and as this is as a rule exceptionally good little difficulty is experienced in getting first-class photographs. which is one of the primary reasons for the excellence of American commercial illustrations.

The photo-engraver's commercial studio often looks like a department store, so plentifully is it bestrewn with a most heterogeneous mass of all kinds of commodities, which are more in place in a shop window. To show how far the attempted realism is carried we may say that we heard of one firm who have a shop window erected in their studio, and the store proprietor sends his window dressers to fit it up, after which a photograph is made.

A further advantage of these daylight studios is that the artists and draughtsmen who are retained on the premises to make cover and advertisement designs can have their models photographed, and are thus enabled to turn out an effective design very rapidly.

All this is a convenience to the manufacturer, as he need give little thought to the preparation of his advertising literature, or at any rate to the illustrating of it, if he is prepared to pay the photo-engraver, who is only too ready to take pains to develop ideas if there is a prospect of getting business. The photo-engraver knows very well that a successful hit in a commercial design means,

much more than the order for a half-tone block. A good negative from the object probably leads to an order for some photographic prints from it, and the negative is kept for future orders. Then there is the enlargement to be made for the purpose of working up to form the half-tone original. Here again, an order may result for some bromide enlargements. Again, a well-worked up original pleases the customer and leads him to cheerfully pay a good price for it. Then comes the making up of the half-tone blocks, probably in several sizes and in different grades of screen ruling The photo-engraver is also most likely an electrotyper or is in connection with some electrotyper, and orders result for electro duplicates Finally, the photo-engraver, who invariably also has a printing plant, gets an order for booklets, folders, or may be a catalogue Not content with illustrations in black, the manufacturer has them reproduced in two-colour, three-colour and quadri-colour Should the article illustrated "catch on," more orders follow for the reproduction of the article in every conceivable way the ingenuity of the advertiser and photo-engraver can suggest.

At first it seemed a mystery to me how some of the big American photo engraving firms could make ends meet. Rents, salaries wages, cost of materials and other expenses all appeared to be on a higher scale than in England and competition much more fierce, prices being practically as low as in this country Where, then, was the money made? Something, no doubt, might be due to the excellent business organization, the directness and simplicity of the methods, the smartness of the workmen, and efficient superintendence, but this would not account for all In my opinion the secret of success lies to a great extent in the cultivation of the business of photographing, designing and printing for the manufacturer. By securing the confidence of the latter many orders result where price is not the consideration. The American manufacturer or business man knows what he wants, can appreciate its business value if it is good, and he cheerfully pays the price for a good thing in the way of advertising, even though it "comes high."

During my recent visit to the States I could not but admire the wonderful originality and resource displayed by such firms as the Barnes-Crosby Co., the Binner Engraving Co, Rogers & Co., Donnelly, Sons & Co, Manz Engraving Co., and others in catering for this class of work. I have many specimens which are simply perfect from the advertiser's point of view. A little touch of colour here and there makes a wonderful difference to the dull drab monotony of a commercial catalogue or booklet, and that is just where our American friends excel.

It may be said that an English business house would never pay the price. My answer is that they have never been educated up to it, and the photo-engraver is accordingly rated at the value he puts upon himself. If he will persist in turning out uniform work which looks exactly like that of his competitor he must expect to get his competitor's price.

The business world wants originality, and it is impossible to assess the value of that by a square inch rate. In my opinion this class of work will tend to largely increase, and the provision of better facilities for getting it will lead to increased demand It is, perhaps, one of the difficulties of London photo-engravers that they do not command the brilliant daylight advantages of their American *confrères*, but by taking best advantage of what they can get in suitably constructed studios, aided by the latest resources of electric lighting, such as the mercury vapour lamp, much may be done.

There is too great a readiness shown in this country to cater for the book and magazine publisher, whilst neglecting the much greater possibilities of profitable business in reproducing commercial objects.

THE ALBERT-GALVANO.

(TRANSLATED BY THE EDITOR)

IN this place nothing has yet been said about the Albert-Galvano, a discovery of the well-known Munich worker in the graphic arts, Dr. E. Albert. After overcoming the aversion towards the unusual novelty, which such a complete revolution of the ordinary working methods must meet, it is now quite clear to all that it is possible to deposit, instead of on a black-leaded wax mould, on a cold-moulded lead matrix. The opinion of every experienced man, as has been often expressed in the German press, in lectures and articles, praises the extraordinary speed of the working operations of the Albert-Galvano in all the stages of the process, the increased strength of the deposit in the strongly heated copper bath, the clearing away of the dirt of the wax moulding from the work rooms and the working plant. Both for electrotyping and for printing the enormous advantages resulting from this new discovery of Dr. Albert's, compared with the conditions of obtaining electrotypes after the old methods, are now recognised without any reservation. Let the inventor himself speak of the economy of the Albert-Galvano. In his booklet "On the Theory and Practice of the Metal Matrix," he has laid down the conditions of his discovery, giving a *resumé* of his procedure, and it is a serious and plainly written work which treats the subject in a very complete manner, the reading of which we can recommend to every electrotyper as an informative addition to his theoretic studies :—

Dr. Albert writes :—"The whole of these discoveries were of revolutionary importance in electrotyping practice. The word revolution refers more to the fineness, the speed, the cheapness and the quality of production than to the alteration of the working methods when installed in an already existing electrotyping shop.

"On the 10th May, 1905, the firm of Ullstein & Co., Berlin, wrote to Dr. Albert :—' Before you leave we would like to tell you of the great difference we have found in printing with your electros instead of with wax moulded electros. I send you, therefore, two examples of each kind. I had never believed that we already to-day should have got some impressions after your engineer only installed the plant in the middle of the past week. The quality speaks clearly in favour of your process.'

"It took only three days to erect the plant, and a considerable part of these three days was occupied in clearing away the dreadful dirt of the wax process.

"Not only this circumstance of being freed from the unpleasant business of preparing the wax plate and the after work it occasions is the result. Of equally great importance is the drawback of the black-leaded matrix, which causes very often an alteration of the tone values of the original. The metal matrix conducts the electric current by itself without black-leading, hereby the electro with one stroke was redeemed from the lowest place in the social scale of printing surfaces.

"The Albert-Galvano is identical with the original. The tone value is based on the nature of the metal matrix and does not depend on the ability of the workman.

"The moulding can be practically done on any ordinary hydraulic press. The machine for successive impressions can, however, be installed within a few hours at very little cost. The increased power of this press is enormous; with 120 atmospheres pressure and a ram of 40 cm. (15¾ inches) diameter, half-tones 40×50 cm. (15¾×19¾ inches) can be moulded. Faulty moulding as with wax through the enclosed air does not come in as the air has the opportunity of escaping in the successive impressions.

"Wax and guttapercha must not only be black-leaded after the moulding, but before the impression must be treated to bring it to a certain degree of softness. Hereby originate alterations of dimensions by the cooling of the mould so that perfect register with multi-colour electros could not be guaranteed.

"The metal matrix is moulded perfectly cold, so that for colour work exact register is obtained with Albert's Galvanos without any difficulties.

"If now already the production of the metal matrix is finer and quicker than the wax or guttapercha, and of a quality which guarantees its identity with the original, the financial advantages are shown even more plainly by the further work on the matrix

"After lifting up the matrix from the forme it is fixed, without further treatment such as 'flaming,' on to a board, nailed down with four nails and the hooks for making contact touching it It is then covered with a film of copper in an incredibly short time on being placed in the bath

"Through the high melting point of the metal the copper bath can be heated up to 50 or 60°C without any risk to the matrix, and this allows of 8 to 12 volts being applied, resulting in a sufficiently thick deposit being obtained in an incredibly short time, for a medium size forme it only needs half an hour to obtain a deposit of the required thickness

"Besides the reduction of time of deposition the high temperature acts favourably on the physical characteristics of the electro-deposited copper as well in relation to hardness as to elasticity, whilst owing to this circumstance the knocking up of the electros is reduced to a minimum

"The detachment of the copper shell from the matrix is so easy, immediate and certain that there is no damage or change made in the metal matrix or in the copper shell.

"The matrix can, therefore, be again hung in the bath for a second copper deposit, and this second electro and eventually the third and fourth are in relation to their qualities in no way inferior to the first.

"When the matrix is not further required, it can be melted up into the backing metal.

"The detached copper shell can naturally be backed up and the electro fitted for printing in the usual way.

"The working method chosen by me makes it possible, as concerns the hitherto existing practice, to obtain considerable economies and advantages which enable a greater output to be made, and it may be said that from the moment of detaching the copper shell to the tinning, backing and complete cooling of the backed-up electros only 15 to 20 minutes are needed.

"Only 1½ hours is required including the moulding and depositing to bring the backed-up, cooled and finished electro on to the machine.

"That the Albert-Galvano requires extremely little straightening has already been mentioned.

"Quite extraordinary advantages are obtained by combining the production of the Albert-Galvanos with a Relief-Cliché (underlay), because through a notable combination of these processes the making of the Relief-Clichés and of the matrix in one practical operation results; one therefore saves either the cost of the relief impression or the matrix impression."

We may add that we give amongst our supplements following this article a four-colour print printed from the Albert Galvano, which strengthens what we have already said about the quality of these productions, especially with regard to the register in multi-colour work.



A SPANISH MOTHER.

Four Colour Etching by
Dr E Albert & Co

Printed from Albert-Galvano with
Albert s Rel ef Overlay

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C



A SPANISH MOTHER.

Four-Colour Etching by
Dr E. Albert & Co

Printed from Albert Galvano with
Albert's Relief Overlay



MISS WARNER.

Half Tone by
Ashworth & Mereditth

Photograph by
Alfred Ellis & Walery



ESSEX RIVER SCENERY.

ON THE COLNE, NEAR HALSTEAD



THE TEMPLE, HIGHCLERE.

Half Tone by
Dean Engraving Co

Photograph by
F O O Stuart.



THE DANSEUSE.

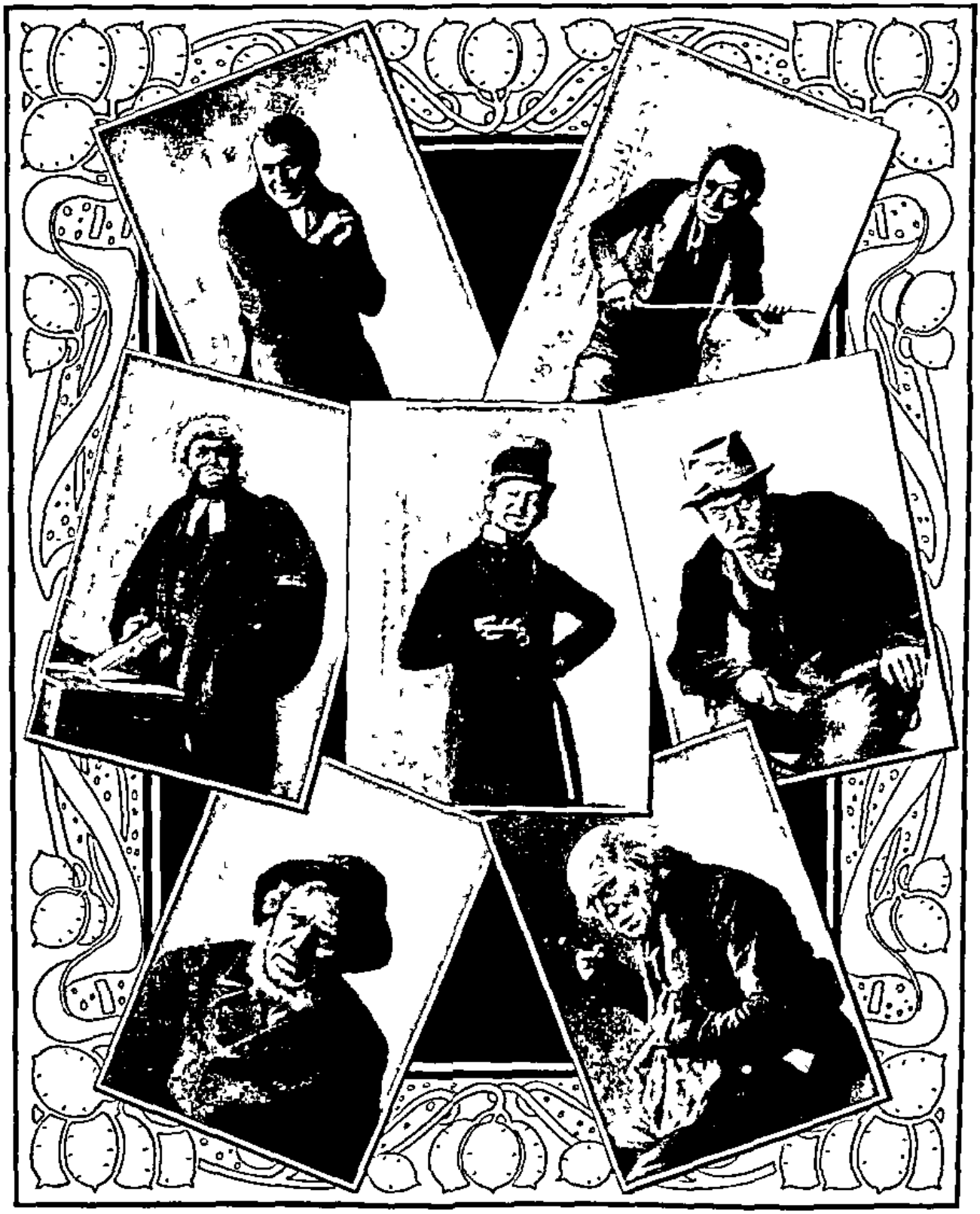
Half Tone by
E. Hamel & Co

Photograph by
Reinhold Thiele

Uriah Heep.
Sergeant Buzfuz
Dan Pegotty

Mr Micawber.

Wackford Squeers
Bill Sykes
Grandfather (*Old Curiosity Shop*).



IMPERSONATIONS OF DICKENS' CHARACTERS BY MR. BRANSBY WILLIAMS.

Half Tone by
Carl Hentschel Ltd

Photograph by
Reinhold Thiele



"MAORIS AT HOME."

Block by Weekly "Press,
Christchurch, N Z

Photograph by
S Head



HEDINGHAM CASTLE, ESSEX.

Half Tone by
The Arthur Cox Illustrating Co., Ltd

Photograph by
James E. Tu[illegible]



"MAORIS AT HOME."

Block by Weekly Press
Christchurch, N Z

Photograph by
S Head



HEDINGHAM CASTLE, ESSEX.

Half Tone by
The Arthur Cox Illustrating Co Ltd

Photograph by
James E Tyler



MISS ELLALINE TERRISS

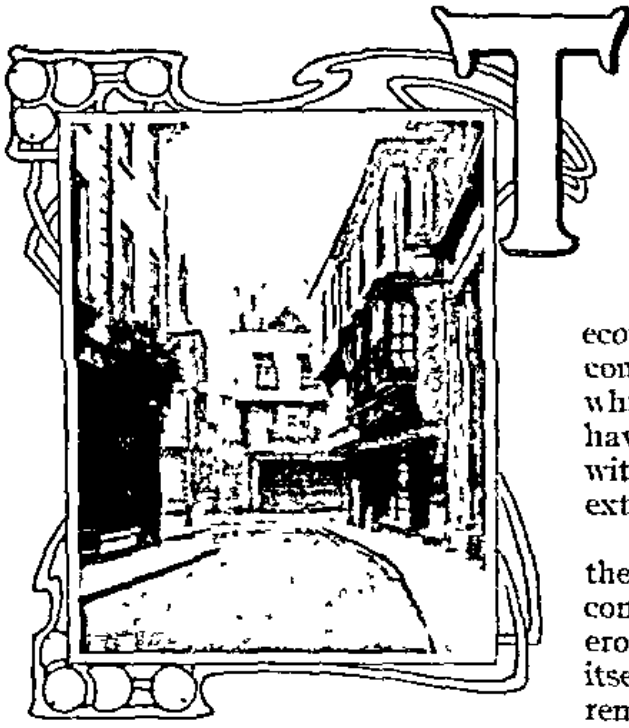
In "The Catch of the Season."

Half Tone by
Carl Hentschel Ltd

Photograph by
Alfred Ellis & Walery

THE ACID BLAST IN PRACTICAL USE.

By LOUIS EDWARD LEVY, Philadelphia.



MERCERY LANE, CANTERBURY
(The Chequers on the left)

Half Tone by ARTHUR COX ILLUSTRATING CO., LTD

Photograph by H. SNOWDON WARD

THE process of etching by means of the acid blast etching machine instead of the customary acid bath in a rocking tray has now become firmly established in American practice. During the three or four years since the blast method was first introduced for regular use, both the machine and the method have been subjected to the test of efficient and economic application under all the varying conditions of practical work. The difficulties which developed in the course of these tests have been avoided or overcome as they arose, with the result that the process is now being extensively employed.

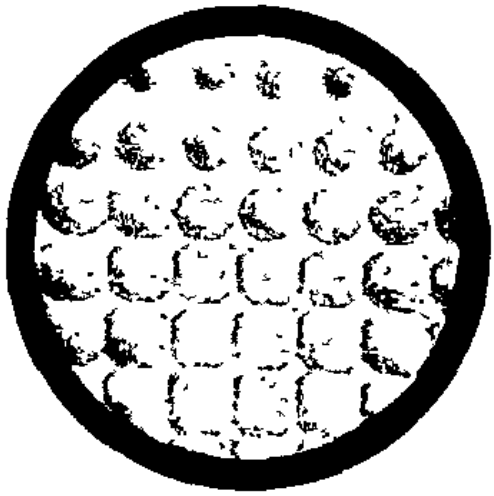
The main technical difficulty in making the acid blast a practicable machine for regular commercial use was from the beginning the erosive effects of the acid on the machine itself as well as on the work in hand. A remedy for this appeared, of course, in the use of some vitreous material, such as glass or porcelain, for the affected parts of the apparatus, but the difficulty of working such materials into the requisite forms, with the necessary degree of precision and accuracy, has required much time and experimentation for its satisfactory solution. Laboratory experiments in this direction were manifestly inadequate to afford reliable observations, and only prolonged experience with various types of apparatus under the exacting conditions of actual practice could be relied on as conclusive. In the light of these experiences the design of the apparatus, both as regards its casing and its mechanism, has been modified, so far as its essential requisites would permit, to meet the technique of the ceramic art, while the latter, on the other hand, has been supplemented by the application of special means and processes to meet the occasion. In the course of this development some of the machines in use in this country, notably those at the *Boston Herald* and at the *New York Journal* (where the blast method of etching has been in use for four and three years respectively) have been several times replaced, but those now in use in those establishments and others in Philadelphia, Chicago, St. Louis and San Francisco, have stood the test of daily operation for not less than a year, and now afford ample assurance that the technical problems presented by the acid blast have been effectually solved. Some of these machines are being worked by two sets of etchers, day and night, or, as in the works of the *New York Journal*, by three shifts of hands, throughout the 24 hours.

The technical requirements of the matter were not, however, the only obstacles to be overcome; others of a psychological and sociological nature, such as have so often stood in the way of innovations on accustomed practice, have cropped up, sometimes in unexpected places. The difficulty of getting practised workers to adapt themselves to new methods has been experienced in the introduction of the etching machine, as was to be expected, and the usual repugnance of hand workers to the employment of machinery in their trade has also made itself felt. But in this instance, as is so generally the case, the increased facility of production through the application of machinery has been followed by an increase in the demand for the product, while at the same time opening new directions for the application of ability and judgment on the part of the workers These conditions soon manifested themselves wherever the acid blast has been put to use, and this, together with the great advantage of this process in saving the etchers from the fumes of the etching tub, has in the end commended it to the favour of intelligent operators

The constantly increasing use of illustrations in the daily newspapers of this country and the urgent need of great expedition in getting out the plates for the successive editions, has naturally led to the acid blast being primarily adapted to meet that demand To that end the machines had to be made large enough to take plates up to 20×24 inches, the normal size of those used for full-page illustrations being 19×23. Plates of that size, or at least 18×22, are also generally used for the smaller illustrations, the various negatives of these latter being stripped and laid down—in reverse, of course—on plate glass sheets until the space is filled up. This obtains generally for the great mass of the work which appears in the "Magazine" sections of the Sunday issues. The work for the daily editions and for the news sections of the Sunday papers is handled on smaller plates to avoid the loss of time in waiting for more negatives The earlier news illustrations are "bunched" on plates 15×18 inches, but the "rush" work about the midnight hour is hustled along in smaller lots and frequently in individual pieces. The time allowed for etching on zinc a 15×18 "flat" of half-tones, of 60 or 65 lines per inch, to stereotyping depth (requiring two "bites" and one four-way powdering) is a maximum of ten minutes. This allows one minute for the first bite, about seven minutes for a four-way powdering and two minutes for the last bite A second four-way powdering and a third bite, usually of about five minutes' duration, completes the line work on the "flat." Plates not larger than 8×10 can be powdered with more celerity, and so another minute or more can be saved. When a plate must be in the forme at a given tick of the clock or stay out, a few seconds may make the difference.

In some of the Sunday papers the half-tones for the magazine section are made with screens of 85 to 100 lines per inch, and printed from directly by being inserted and fastened upon the stereo plates of the type matter. These illustrations are generally included in full-page "combination" plates, consisting of the half-tones grouped in a more or less ornamental framing of line work specially designed in each instance, with contours arranged and spaced to permit a further combination of the design with the type matter A high degree of practised skill is evinced in transposing the large line negatives of these designs from their original support to the plate glass, cutting out the blanks for the half-tones and then transposing the latter to their respective spaces These are frequently of very complicated outline, but the work is executed with remarkable rapidity. In some places, as at the *Boston Herald*, where from 32 to 48 such plates (duplicates of 16 to 24) are required for each Sunday issue, they are produced

ACID BLAST ETCHING COMPARED WITH TUB ETCHING
Magnification about 24 diameters (See Article by Louis Edward Levy).



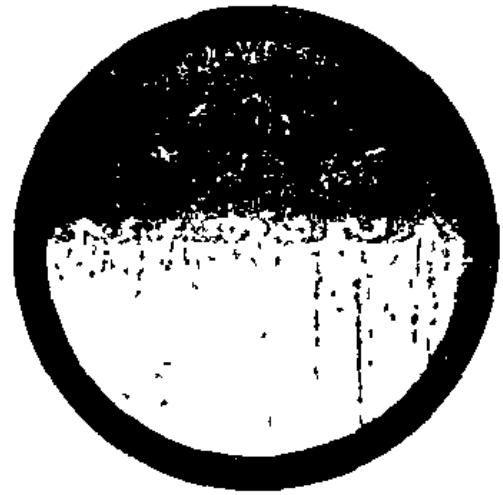
1.—Surface of zinc half tone plate 85 lines per inch, blast etched in one bite of 3 minutes. Acid 6 Beaume. Blast pressure 1 lb. per sq. inch



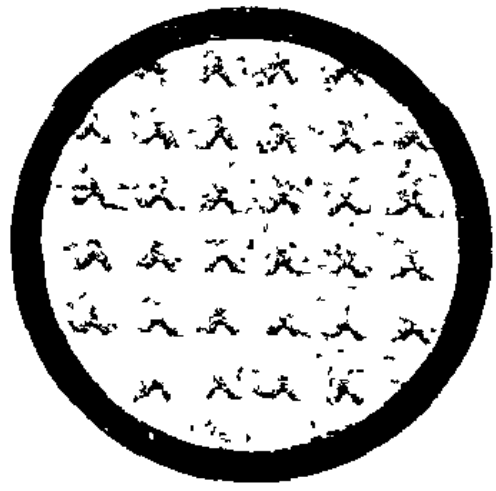
2.—Surface of zinc half tone plate, 85 lines per inch, tub etched in two bites and one 4 way powdering



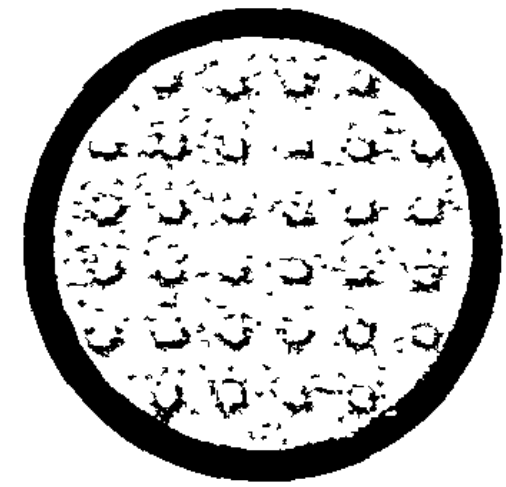
3.—Section of zinc half tone plate 85lines per inch. Blast etched in one bite of 3 minutes. Acid 6 Beaume. Blast pressure 1 lb.



4.—Surface of zinc half tone plate 85 lines per inch, tub etched in two bites and one 4 way powdering



5.—Surface of zinc half-tone plate 85 lines per inch. Blast etched in one bite of 3 minutes. Acid 6 Beaume. Blast pressure 1 lb. per sq. inch

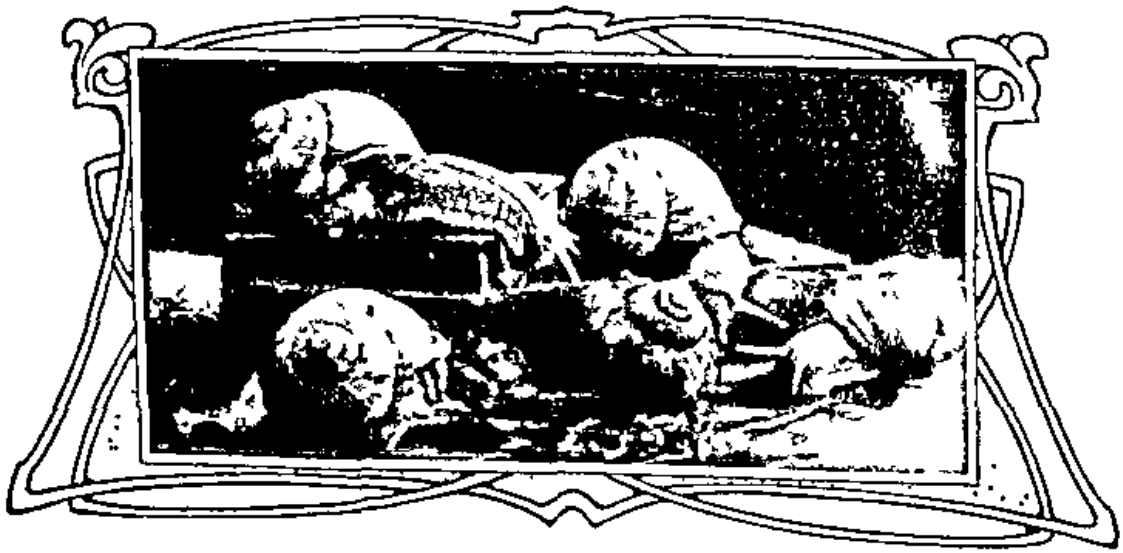


6.—Section of zinc half-tone plate 85 lines per inch, tub etched in two bites and one 4 way powdering

with the glue enamel process. The half-tones of 85 to 100 lines are etched to the requisite printing depth in one straight bite of about two minutes and the line work is then etched down to " routing depth " (after a four-way powdering) in a second bite of five or six minutes These illustrations covering as they do nearly or quite the entire page, require plates 19×23 inches, which, for greater security in " anchoring " them into the stereotype plates, are of double thick gauge, that is to say, $\frac{1}{8}$ inch instead of the usual $\frac{1}{16}$ inch thickness

In this connection it may be interesting to remark that one establishment, that of the *St Louis Republic*, has adopted the practice of using, at least for a section of their Sunday magazine, zinc plates of $\frac{1}{4}$ inch thickness, on which the type matter to be included is photographically reproduced along with the rest of the combination. These plates are bevelled on the edges the same as stereos, and after being bent in a suitable mechanism to the requisite curve are fastened on the press cylinders over jackets that bring them up to full ste eo thickness The use of these etchings on thick zinc instead of the electrotypes which they have replaced, has been found advantageous, both as regards the saving of time and of cost as well, and that, too, notwithstanding that these etchings have to be duplicated to meet the requirements of the edition The manipulation of these thick plates has been greatly facilitated by the use of one of my recently perfected powdering machines, modified for the purpose, the acid blast in which they are etched having also been slightly altered to accommodate them

The blast method of etching having been thoroughly tried out, and the details of its mechanism definitely determined on in the light of that experience it remained only to perfect the necessary equipment for the manufacture of the apparatus. This has been done by The Graphic Arts Co , of Philadelphia, which holds the patent rights of the machine, but mainly, as yet, with regard to the largest size required for newspaper use. Attention is now being given to the production of two smaller sizes, designed to meet the requirements of commercial engraving establishments, and embodying the experience gained in practice on the larger scale.



SNAILS

Half Tone by
THE ANGLO ENGRAVING CO

Photograph by
MARIE LEON





THREE-COLOUR WORK.

Blocks supplied by
Messrs John Swan & Son, Ltd,
High Barnet

Inks supplied by
Messrs A. P. Fl[illegible]





THEFT OF OUR WORK.



THE COMPLEMENTARY COLOUR REPRODUCTION PROCESS.*

By C. G. ZANDER.

I well believe
Thou wilt not utter what thou dost not know;
And so far will I trust thee.

Henry IV., ii 3



GLOUCESTER (from North West)

one by
BROWNE, LTD.

Photograph by
REV. T. PERKINS

GREAT as was the future unanimously predicted for three-colour printing when it made its public appearance and caused a sensation in the printing world, some prophesying the early extinction of chromo-lithography by the process of photo-mechanical colour printing, the early results were far from perfect. It was contended, however, that the process was then in its experimental stage, and that there were technical difficulties and defects in its practice which had to be overcome. Amongst these difficulties were photographic plates comparatively insensitive to various colours (particularly red), incorrect colour filters, unsuitable printing inks, inexperienced printers, and the unsatisfactory method of printing from half-tone blocks.

Fifteen years or more have passed, and when looking back upon the early productions of three-colour printing one cannot help being disappointed at the comparatively small progress which has been made.

Most of the above-mentioned technical defects and difficulties have been overcome. We now have panchromatic dry plates, and lso emulsions, with a practically perfect sensibility to the whole range of spectrum olours. The action of colour filters has been studied by many patient observers, ie inks have had their share of attention and can be made practically perfect in ue and proportionate density. The half-tone blocks, especially those of fine grain, ave been very much improved in the matter of sharpness of detail and gradation f tones. The printers have also learned and fairly mastered their lesson. We ust mention the fine-etcher, the skilful artist whose hand work overcomes any of the mechanical defects of three-colour work. It is his business to medy the incongruity of the filters and printing inks, to correct photographic rors, and to make the best of the limited colour-range available in three-colour ork, in order to approach as near a facsimile of the original by hand work, as possible in the process; his importance in the production of three-colour half-ne blocks is now fully recognised, and quite a generation of highly-trained id skilled fine-etchers has grown up. As a matter of fact if it had not been for ie fine-etcher, the three-colour half-tone printing process could never have tained to the commercial importance which it has done.

D

* British and foreign patents pending

Considering the progress made in the perfection of the materials, the overcoming of technical defects, the improved skill of the block maker and printer, we repeat that the results obtained, even with the best three-colour blocks under the most favourable conditions are disappointing, and no judge of art would class a three-colour print amongst artistic reproductions—they find no place in our best print and picture shops To enumerate a few of the defects we would mention —

The limited range of colours—there are no pure greens obtainable but instead an offensive juxtaposition of blue and yellow dots, no pure blues in skies, no brilliant crimsons, violets, no pure blacks or homogeneous greys There is always one predominant hue obtruding, mostly a dirty purple or hideous green Most of the brilliant colours can, of course, be dispensed with in the reproduction of paintings, but in commercial work, such as, for instance the reproduction of drapers' pattern cards, carpets and the like three-colour work has proved itself an utter failure.

In his studies to find ways and means of overcoming the defects and shortcomings of the three-colour printing process, the writer of this article reasoned that if the materials were perfect or nearly so and yet the results were imperfect the cause of the failure must lie in the philosophy of the process It was with great reluctance that, failing everything else, he at last set himself to find out whether the Young-Helmholtz Theory of Colour Vision on which the three-colour process is based, was really the best basis for photo-mechanical colour reproduction, or whether some other colour scheme worked out, would produce better results The writer asserts that he has found another colour scheme which in actual practice yields far superior results to the famous Young-Helmholtz Colour Theory, as far as the range of colours and other effects are concerned. The Young-Helmholtz Theory of Colour Vision assumes three fundamental colours, by mixture of which in various proportions all colours in nature are to be matched. The theory, on which the writer bases his process of photo-mechanical colour reproduction assumes and uses not three but *four* fundamental colours, *viz.* :— *red*, *yellow*, *green* and *blue*, by mixtures of which in suitable proportions any colours in nature can be matched or reproduced. The hues of these four fundamental (or monochromatic) colours, red, yellow, green and blue may in popular terms be approximately described as follows :—

Magenta Red,	Emerald Green, and
Lemon Yellow	Ultramarine Blue.

It will be found that magenta-red (we use this name for the lack of a more scientific one) is one of the constituent colours of spectrum red (magenta-red + Yellow) and also of Spectrum Violet (Magenta-Red + Blue)

The four fundamental colours can be grouped into *two pairs of complementary colours*, *viz.* :—

Red and Green,
Yellow and Blue,

so that when the elements of either pair are mechanically mixed as pigments, by printing or staining, they produce black, while the effect of their optical combination produces the sensation of white light.

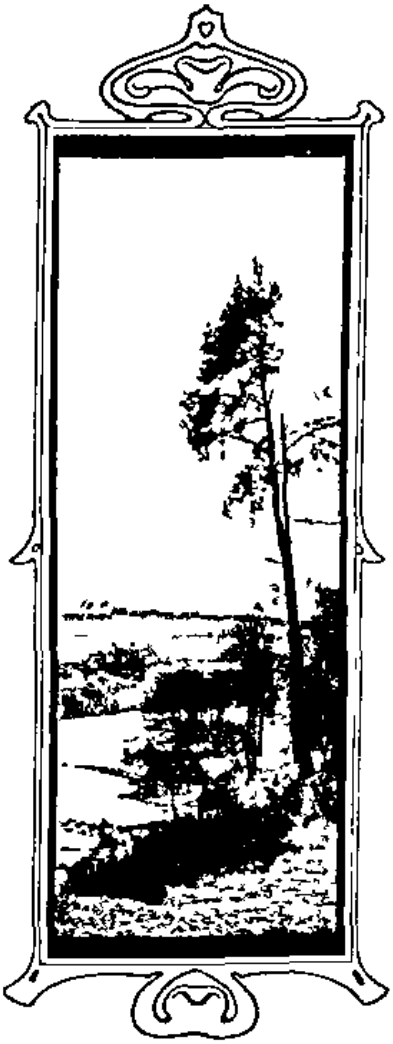
It will at once be seen that the complementary colour reproduction process does not consist of a mere addition of green to the yellow, red and blue of the three-colour process, but is based on a scientific adjustment of the above-mentioned four fundamental colours, so that they form two pairs of complementary colours as indicated.

The complementary colour scheme described above is applied to photo-

mechanical colour reproduction. The two pairs of complementary colours (red and green) and (yellow and blue) are used as printing or reproduction colours. The complementary colour reproduction process undoubtedly offers many important advantages over the non-complementary colour schemes (yellow, red and blue) or (yellow, red, blue and black or grey) at present in use in photo-mechanical colour reproduction.

Amongst such advantages are the following :—

1.—The range of mixed colours which can be produced by the Zander Complementary Colour Reproduction Scheme is very largely extended and comprises *the whole range of spectrum colours*, extra-spectral purples, dense pure black and homogeneous greys. Among the pure colours obtainable by this process may be enumerated in particular : pure brilliant magenta and purples, emerald green, ultramarine blue, violet, colours which cannot be produced in three-colour work.



A Scottish Landscape

Half Tone by Dean Engraving Co Photograph by J Trotter

2.—The reproduction of dense pure black or homogeneous neutral or tinted greys can be accomplished with ease owing to the fact that either of the proposed two pairs of complementary reproduction colours are already sufficient to produce black (or grey) which is impossible to do with any two non-complementary colours, or even the three colours used in photo-mechanical colour printing at present.

No pure black can be reproduced at all in three-colour printing.

3.—In printing, the reproduction of any given subject by two pairs of complementary colours (instead of three non-complementary colours alone or with the addition of black or grey) will prevent great variations in the several impressions, particularly in long runs, owing to the fact that slight variations in the impressions will not obtrude themselves as much in an *ensemble* of four colours as in three. It is well known to every chromo-lithographer that the greater the number of plates requisite to reproduce a given object, the fewer will be the variations between the finished prints.

4.—A more accurate reproduction of the original is unquestionably possible than by the non-complementary colour processes at present in use, owing to the greatly extended range of the single reproduction and mixed colours.

5.—The hand work or fine-etching, by far the costliest part of the present processes of photo-mechanical colour reproduction, will be reduced to a minimum, as not only the reproduction colours among themselves, but also the photographic colour records and the reproduction colours, stand in more rational and scientific relationship. As mentioned before, the reproduction colours consist of two pairs of scientifically grouped complementary colours, while the relative colour negatives, broadly speaking, represent photographic monochromatic records of all the spectrum colours, complementary to the respective reproduction colour. Practical workers know that this is not the case in three-

colour work, and has (with the limited colour range) to be compensated for as far as possible by the skill of the fine-etcher.

The standardizing of colour-filters and reproduction colours, so long hoped for and aimed at in three-colour work, becomes an accomplished fact in the complementary colour reproduction process, in which filters and reproduction colours are carefully and scientifically selected and adjusted, and are of standard hues which may be used with equal success on any subject by any blockmaker or printer respectively.

The working of the Zander Complementary Colour Reproduction Process requires no special plant beside that which is necessary for working the three-colour process, or which is found in the establishment of every three-colour block-maker or photographer, the only addition being a set of four special colour filters. These colour filters materially differ in hue from those used in three-colour work, and their correct chromatic construction has been a matter of great care and patient study in order to compensate for the defects of the panchromatic photographic plates. The actual practice of the process offers no technical difficulties whatever to the expert, skilled in three-colour work The invention distinguishes itself by its great simplicity and its wonderful results

The Complementary Colour Reproduction Process explained above is applicable to every process of photo-mechanical colour reproduction, such as typographic block-printing in half-tone, line and the like, photo-lithography (both from stone and plates), collotype, photogravure, Woodbury-type and the like, also for reproduction by superposition of transparencies in colours.

Attention is drawn to the two pictures which illustrate the new process, one printed from blocks supplied by Messrs. Edward Mortimer, of Halifax, and the other from blocks supplied by Messrs. John Swain & Sons, Ltd., High Barnet. The latter (a basket of roses) is also reproduced in three colours to enable the reader to compare the capabilities of the two processes. It will at once be seen that the very bright magenta, green, violet, etc., could not with the very best skill be reproduced by three-colour work. These colours, of course, were selected purposely, and therefore the picture should not be criticised from an artistic point of view.



RATTENDALE HALL-I TH'-WOOD

The Hall i th Wood is where Crompton invented the spinning machine

Block by
F. HAMEL & Co

Photographs by
J W TOOTILL



DANTE AND BEATRICE.

Three Colour Blocks by
John Swain & Son, Limited

From the Painting by
Henry Holiday



DANTE AND BEATRICE.

Three Colour Blocks by
John Swain & Son Limited

From the Painting by
Henry Holiday

INEQUALITY IN THE IMAGES PRODUCED BY THE COLOUR FILTERS IN THREE-COLOUR WORK, AND SOME SUGGESTIONS FOR THEIR CURE.

By REGINALD S. CLAY, D.Sc.



PHOTOTYPED

Half Tone by PHOTOCHROM CO., LTD

Photograph by BARNE & CO

IT frequently happens that in three-colour work there is a slight difference in the sizes of the pictures taken through the three coloured filters. In nine cases out of ten such a difference will be the fault of the light filter—either the three filters have different thicknesses which, as pointed out in the last ANNUAL, will alter the sizes of the images, or the glass of which the cells are formed is not optically flat. Few workers realize the enormous effect of a very slight want of flatness of the glass forming the cell for a filter. If one of the sides is, for instance, only very slightly convex, it acts, of course, as a very weak convex lens, and may easily shorten the focal length of the lens of the camera and so alter the size of the picture. Also, it will produce a distortion which is even worse. Thus it is necessary before blaming the lens to make quite certain that the lens is to blame. To do this see first if the definition with a filter in, is as good as it was without the filter. If there is much loss of definition the cell must be rejected. If, however, it remains good, then take three exposures with *the same cell* using it for each liquid in turn. If there still is a difference of size in the three negatives it cannot be the fault of the filter, but is, of course, caused by a slight want of achromatism of the lens. If the lens is under-corrected its focal length for a red light will be slightly greater than it is for a green light, and that again slightly greater than it is for a violet light. Thus, if each picture is carefully focussed in turn, the red picture will be the largest, the green the next largest, and the violet the smallest. No doubt, with any good lens, the difference will be very small, but when the pictures come to be super-imposed a difference of size of much less than a twentieth of an inch is quite perceptible.

It *may* be possible to maintain the three pictures of equal size, even if the lens is not fully achromatized, if the focus is not altered between the exposures; that is, if there has been no alteration in the distance from the lens to the plate, nor any variation in the displacement of the image caused by a variation in the thickness of the colour filters. This will involve, however, a loss of definition, if the foci for the different colours do not really coincide. Possibly if the negative is kept sharp, a slight want of definition in the yellow-

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PROTECTED

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printing negative will not seriously matter, but in the case of the red-printing negative it would be impossible to ignore it. I said that *possibly* the images may be kept the same size, but even this may not be so to the order of accuracy that is now being considered; for the position of the nodal point of a compound lens is not the same for all colours, and as the size of the image for a given position of lens, object and screen, depends upon the distances of the object and screen from their respective nodal points, it is obvious that if the nodal points vary slightly in position with the colour of the light, so will the size of the image vary.

There is another and, I believe, better, way of correcting the want of achromatism of the lens, namely, to slightly alter the focal length of the lens itself by unscrewing either the front or back lens of the combination in its mount.

Most photographic lenses consist of a "front" and a "back combination" mounted one at either end of a short tube with the diaphragm between them. Each of these combinations will consist of two or more lenses, which are usually cemented together, and is calculated to be achromatic by itself. In some cases these components can actually be used independently, but they will not have such a flat field, nor will the margins be so well defined (owing to astigmatism) as when they are used together as mounted by the makers. The focal length of the lenses thus combined is roughly half that of either of the components when the latter are equal, it varies slightly with the distance between the components. It is this variation that I propose to make use of.

Two cautions are necessary here. In the first place, to alter the distance apart by any appreciable amount is likely to increase either the curvature of field, or the astigmatism, or both. In the second place (and this is even more important here, as I am proposing only a small movement) rotating a lens will nearly always affect its alignment and centring. For this reason the lens should either be rotated through a very small angle—say 15° or 20° at most, or through *one or more complete revolutions.*

Let us suppose then, that it has been proved as explained above that there *is* a difference of focal length for the three filters, and that the definition when the screen is not refocussed for each filter is in consequence not sufficiently good—or that the stop required to give a good image has to be so small that the exposure is seriously lengthened; can this defect be got over? I believe it can.

All that is necessary is to focus carefully some well-defined object, such as a newspaper, with each filter in turn, and make an exposure. Then superpose the negatives in pairs, and so find which is the smallest, and by how many dots in the whole diameter of the plate. It can easily be shown theoretically (and I have tested it experimentally) that a small increase in the distance apart of the components will increase the equivalent focus by a quarter of that increase in distance apart. Thus, very roughly we may say that one complete revolution of the lens will increase the whole diameter of the image by the one dot in the case of any lens, up to say, 15 inches focus. (A much larger lens will have a coarser screw and a revolution of the lens will separate it farther from the other component and so produce a greater increase in the size of the picture).

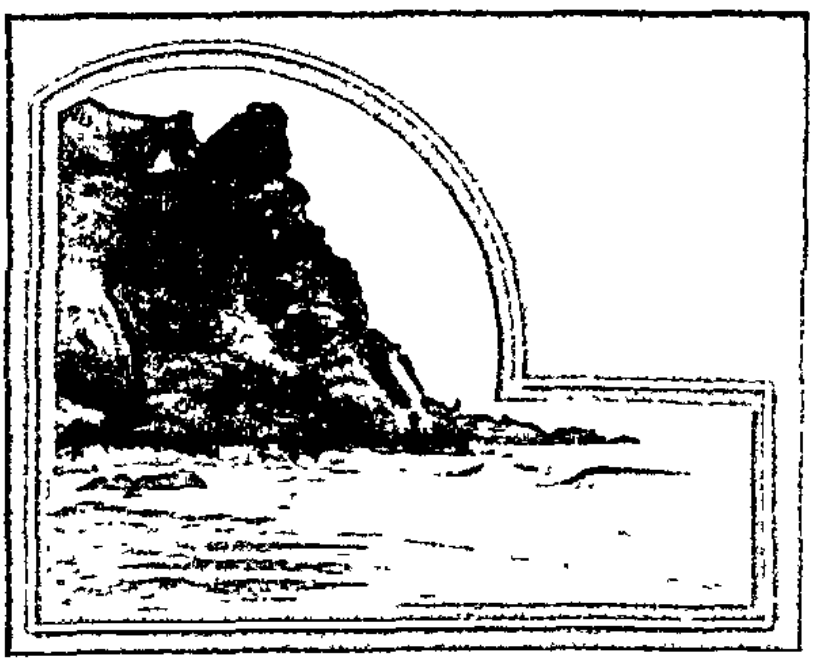
But it is quite easy to try the effect of one or more revolutions by making another exposure. As an example, let us suppose that the yellow printing negative is three dots, and the red one dot, smaller than the blue printing one. Then expose with the lens screwed up home for the blue printing one, unscrew one revolution exactly for the green, and refocus and expose; unscrew three revolutions exactly, refocus and expose again for the yellow—of course, using the appropriate filters. If these prove the same size, and the margins have not suffered too much loss of definition, the amounts the focus has to be shifted between the three

exposures can be observed once for all. Then in any future work the image having been focussed with one filter (say the orange), it will only be necessary before the next exposure to unscrew the lens to the right extent, and turn the focussing screw the amount noted.

The Cooke lens behaves quite differently. Unscrewing the front lens alters the focal length very rapidly—it also rapidly affects its corrections. By the kindness of the Editor I have been able to test a Cooke Process Lens, which is the one perhaps most frequently used by three-colour workers in this country. It was a twelve inch lens and I found that unscrewing the front lens *shortened* the focal length, and would reduce the size of the image by about one dot for every 3° or 4°. So that in the case of this lens it should never be necessary to rotate the lens more than 10° or 15°. This is important, as any further rotation would impair the perfection of the image, and workers are advised to refrain from unscrewing it more than 20° (*i.e.*, more than a quarter of a right angle).

The extreme sensitiveness of this adjustment of the Cooke lens, which would enable any slight residual chromatic error to be easily corrected, seems to me likely to make this lens increasingly used for three-colour work.

It must not be imagined that any such dodges will enable good three-colour work to be done with a bad lens, for it must be remembered that each filter lets through not one colour, but about a third of the whole spectrum, so that unless the lens is achromatic it cannot focus this all at the same time. But three-colour work is such a severe test for a lens, that even the best lenses may have enough residual error to prevent really good work, and it is in the case of such a lens that this small residual error can be eliminated by a very slight change in the distance apart of its components without appreciably affecting any of its other corrections



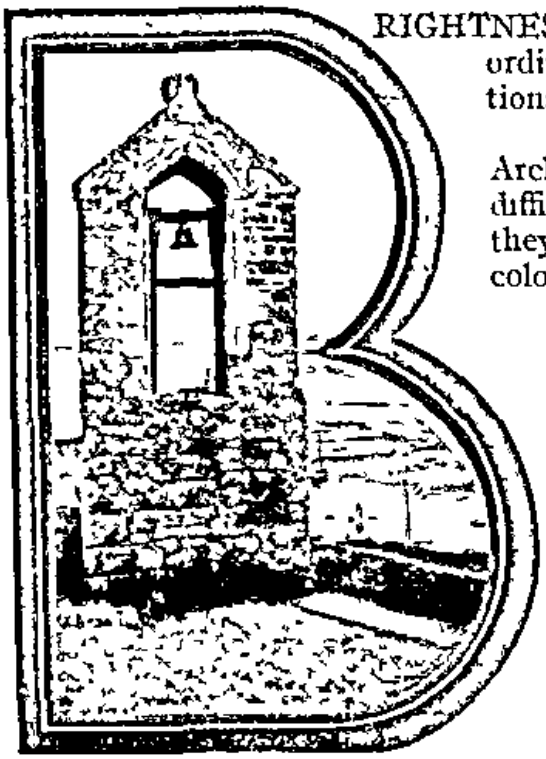
Mont Pelvoux, Jersey

Half Tone by
Gilchrist Bros.

Photograph by
C. S. Peat.

BLACK PLATES.

By L. DELGEUR, Rotterdam.



Block by GILCHRIST BROS

Photograph by C. S. BEST

BRIGHTNESS of the emulsion is the cause why ordinary plates do not render all colour gradations as accurately as possible

Years ago Lumière wrote (in the "Photo Archiv," No. 780, page 375) that it was very difficult to sensitize plates for green-blue because they would not well assume the complementary colour of green-blue, that is to say, orange.

An ordinary plate is bright yellow tinted. Yellow is complementary to blue. An ordinary plate is therefore very blue sensitive.

The emulsion is sensitized for green after dyeing in a purple solution, green and purple being complementary.

Even by dyeing in a blue-green solution the sensitiveness for red is rendered possible (blue-green is complementary to red). For rendering the emulsion colour sensitive several hundreds of aniline dyes are indicated, even the faulty expression "actinic rays" is invented to approve the ordinary plates.

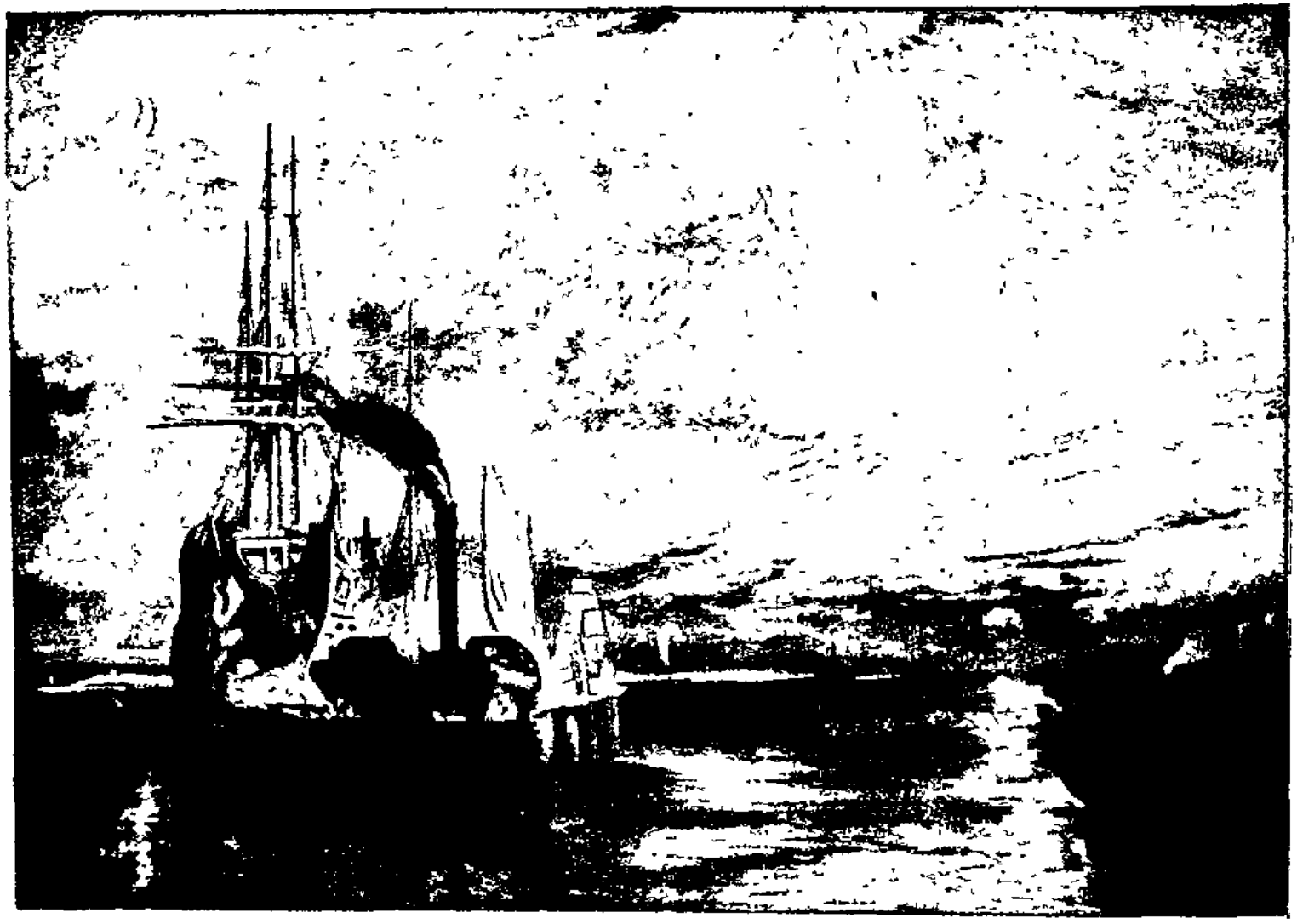
Why not take as reaction the absolute negation of any colour—black, an indifferent black which must have, of course, the property of being able to be washed out during or after development.

The reason why dry plates must be black is shown in the following table:—

Plate dyed in		Filter.		Sensitized for Coloured Lights.
Yellow.	Complementary	Blue.	Complementary	Yellow.
Purple.		Green.		Purple.
Blue-green.		Red.		Blue-green.
All pigment colours mixed = Black.		No filter, white light.		Light of all colours mixed = White
Gives darkness = printing property.				Gives white light.

White light in darkness gives white light.

I believe that if all plates were coated with black emulsion they would be just as good as they are now bad. Black, by absorbing all colours, must be better than the bright yellow tint now in use.



THE FIGHTING TEMERAIRE.

By Turner.

Three-Colour Blocks by
Messrs. J. SWAIN & SON, Ltd
58 Farringdon Street E.C.

Direct Three-Colour Half-Tone Negatives made with Collodion Emulsion in the Evening Classes at the Regent Street Polytechnic.

line from H to B, or whether it should possess three maxima, one in the blue violet, one in the green, and one in the orange-red. If we consider the subject from the point of view of the plate, however, the preference will readily be given to the first one. A plate whose curve of colour sensitiveness is practically even will not vary in different batches very greatly, and the greatest variation of all will be in the relation of the sensitiveness to blue-violet to the sensitiveness to the sum of the remainder of the spectrum; the sensitiveness to narrow individual regions of the spectrum will not vary much in proportion Hence with such a plate all we must do is to determine the relation of the blue sensation exposure to the "green" and "red" exposures—it may vary in different batches But when we come to a plate which has three maxima of sensitiveness, each maximum may vary in different batches, and the tapering off between each will also be liable to vary very greatly; it will thus be necessary to adapt wet filters to each batch of plates, and then to determine the relative exposures The amount of labour saved by using a plate of even colour-sensitiveness is thus obvious

Plates closely approaching this desirable ideal are nowadays obtainable, and there is every reason to believe that a much higher state of perfection will be reached within the next year or two We have to thank the aniline dye research chemists for their indefatigable work in connection with the isocyanin derivatives, and to look forward to the days when an emulsion plate will be produced equal in even colour sensitiveness to those obtained by the undesirable and messy process of bathing.



EVENING

Design and Half Tone by
W & G BAIRD, LTD.

Photograph by
H W KINGMAN

THE BEST PRINTING PROCESS FOR SMALL WORKERS.

By H. HANDS, JUBBULPORE, E.I.



JACK AND JILL.

Half Tone by CATTELL & SON — Photograph by BYRNE & Co

AS in all things, there may be room for a difference of opinion in this matter, but a long experience has convinced me that albumen is the only steadily reliable process for the men to whom I address this note It is the simplest, the easiest, and, with care, the equal in results of glue. With a good formula and a good ink a good etchable print may be obtained from negatives varying very much in technical quality. For successful printing on glue there is scarcely any latitude allowable in making the negative; this must conform very nearly to a standard We all know how difficult it is for the man who (not being a genius) makes a few negatives only at intervals to obtain perfect results in every case. Hence, as the albumen process allows of some latitude in printing, and also in development, it must be the superior of glue for the case in point. I am aware that Mr. Hermann Schmidt claims great latitude for his dry process, but I have had no experience of it, and cannot give an opinion. If his claims are justified, I should say that (supposing it is as easy to learn and work as albumen) it would be superior to albumen, since the resist can be kept on the plate, and by adding to the depth allow of shorter etching than a plate that must be cleaned off. By the method here described a print may be obtained that will stand an etching bath of any reasonable strength. The albumen formula is Cronenberg's, and my experience is that it is absolutely reliable and always the same, while it keeps well in hot weather. No glue formula will keep more than a few days in high temperatures.

(1) Liquor ammonia 12 parts.
Alcohol 18 „
Ammonium bichromate 6 „
Water 100 „
(2) White of eggs beaten to a froth and allowed to settle

Sensitizing solution :—
No. 1. 1 part
No. 2. 1 „
Water. 2 parts
Filter through glass wool or cotton

For weak negatives do not dilute the above, but whirl faster to get a thinner coating. Roll up with " American etching ink " (sold by Penrose & Co.) Never thin it till obliged. In high temperatures it will spread without. In the cold season when the temperature goes down, warm a small quantity in a clean metal pot, and add a few drops of spirit of turpentine, stirring with a clean glass rod till thoroughly incorporated. If it is too soft when cold and spreads too easily, warm again and add more ink. Remember that thinning renders the ink very liable to smear when developing, so avoid it if you can. By warming the ink slab and the plate a stiff ink can be used and a firm, even coating obtained Then, if necessary, the image will stand harder rubbing in development—an important point. Dust the plate after development with Calmel's powder (Penrose & Co), and in brushing off the surplus remember that the less brushing you can do with to ensure a clean plate the better, as the maximum quantity of powder is retained on the image. Heat the plate slowly and equally till the powder glazes, then, while still hot (not excessively so) rub over with Russell powder (Penrose & Co.), using a good sized piece of cotton wool and a fair amount of pressure.

I discovered that by using Russell powder I got a stronger resist without blocking up the plate, and prevented bubbles attaching themselves to the resist when using stronger acid. This method gives a resist the dots of which are perfectly sharp



GOING FOR TURF (BUNDORAN)

Half Tone by
W & G BAIRD, LTD

Photograph by
R WELCH



THE PRINCESS.

Three Colour Blocks
by The Arc Engraving Co,
Limited

. My hopes and thine are one
Lay thy sweet hands in mine
and trust to me

—*Tennyson.*

ways by which these difficulties may be overcome, namely, (1) the plate may be made more sensitive to red or green light, (2) the redness or greenness of the light may be made brighter. The first is the only method of general applicability, and it has been worked at with exemplary perseverance and great success. The second method is not applicable to daylight except in a secondary sense, because in getting the light (or colour) that is wanted from a given light, the only method is to remove that part of the light that is not wanted by the interception of a coloured medium. The only care that can be bestowed is in seeing that none of the light that is wanted is absorbed by the colour screen or filter, and it is in the control possible in this matter that stained films or coloured solutions are so far superior to coloured glasses. There are comparatively few varieties of stained glass, but the innumerable dyes that are applicable either for colouring films or solutions give an almost infinite choice. The improvement of colour filters has been carried to a high degree of perfection.

But process work that is done in the studio by means of artificial light gives the worker a measure of control over the light source itself. He can select a yellow light, and this generally means one richer in red and green than a whiter light, or he can colour his light by introducing suitable substances into it Obviously it is useless to increase the brilliancy of the light by adding to it a constituent that is not wanted and has afterwards to be removed. Ordinary gaslight and incandescent electric lamps give a more yellow light than daylight or an incandescent Welsbach mantle, it therefore follows that the former are more advantageous so far as colour goes when red or green light is the chief desideratum. Roughly speaking, I have found that ordinary gas flames used without any coloured medium give about the same effect on isochromatic plates as daylight with a colour filter that requires the exposure increased to four times. That is, that for the same amount of useful green light, daylight gives, roughly, about four times as much useless blue light that has to be got rid of, as ordinary gaslight.

It is customary to use arc lights for three-colour work in the studio. The light given can be coloured by impregnating the carbons with various substances, or perhaps using other materials than carbon, and in this case somewhat of the colour wanted can be obtained by *adding* it to the light, instead of merely removing by absorption with coloured media that part of the light that is not wanted. Our Editor assures me that it has already been found possible in this way to reduce the necessary exposure when using the red screen to about one-half. Perhaps by further investigation it may be found possible to save still more time, and what has been done so far for the red may be done for the green.

It may be remarked that there are many considerations that have to be borne in mind in seeking for substances to serve this purpose. First, of course, the colour produced must be suitable, that is, the light emitted must be not only of the right colour, but must at least approximate to the desired range of spectrum colours. If, for example, thallium salts were used, trouble would doubtless follow, although they might produce a brilliant green light. The thallium light is nearly monochromatic, giving a bright green line in the spectrum. If the green in the object to be photographed were also monochromatic, and not coincident in the spectrum with the thallium green, it would behave as black so far as the thallium green light was concerned. Therefore, it does not follow that because a red or green exposure can be reduced by such means, that the method will be found to be generally serviceable But, on the other hand, colour photography is full of compromises, and the greater number of substances likely to be employed do not give any approach to monochromatic light. Then the material must not be too volatile or the added brilliance it gives may grow less

as the carbons are consumed, and the exposure will be uncertain—the worst of evils. It will be necessary, also, to beware of poisonous fumes, for the arc lights are generally used in the open room. The colour screens made for ordinary light would probably need adjustment to suit the altered light. In short, as three-colour photography is not a mere matter of red, green and violet lights, but of the proper division of *all* visible light into three suitable parts, any new kind of light would require the adjustment of other details to it.

As an example of a case where, if the user of the process had understood the principle of it, he would doubtless have saved himself a large measure of the inconvenience of it from the very first, I may refer to the fact that ammonium sulphide for intensification purposes has been largely replaced of late by sodium sulphide, which, being non-volatile and only slowly decomposed by exposure to the air, does not evolve so strong an unpleasant odour. In this case it is a soluble sulphide that is wanted, and it is a mere matter of convenience what sulphide is used. A simple change of this kind does not require much inventive ability, and hardly any investigation before it can be safely made in practical work.

The delay in the introduction of improvements is due very largely to the gap that exists between the practical workers and scientific students. A physician cannot help a sick man unless the sick man goes to him and states his needs. If the physician has to find out his patient's weaknesses for himself, he has to keep him under observation for some time, that he may become more or less intimately acquainted with him. If the practical man would definitely state how he suffers, or give the scientific student an opportunity of finding out wherein his work might be improved or made more agreeable, something might be possible even at present, in spite of the scarcely bridged gulf that exists between them.



PRESTBURY.

Half Tone by
E. HAMEL & Co

Photograph by
W. P. THOMSON

SCHULZE'S HALF-TONE PROCESS.

By DR. G. AARLAND, Leipzig.

ALTHOUGH the practical man admits the want of a better half-tone method, great conservatism is shown towards newly introduced processes. The reasons for it are not difficult to find One does not care to leave the antiquated for conscience sake

If we consider how much good has been offered and how little has been made practically useful, we must declare that the practical man shows such marked conservatism to his own disadvantage We should be much further advanced if this were not the case

The same also happens with Schulze's process for the production of half-tones, which process shows decidedly great progress.

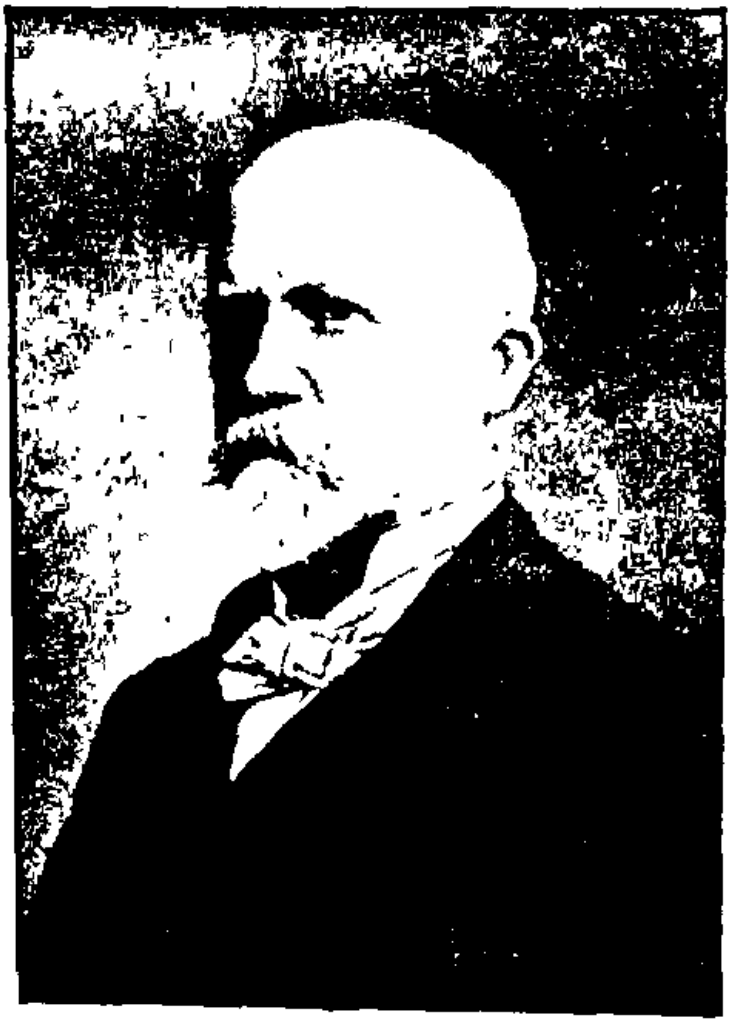
In many cases novelties are not observed at all, because books and periodicals are not studied—a fact which probably is not so marked in England as with us—or interest is wanting altogether.

The portrait which accompanies this article has been made, by kind permission, from a half-tone negative and from an etching by the new patented Schulze process.

No retouching, fine etching or engraving has been done on this block.

The negative produced from a portrait sent in has been printed by the enamel process on copper, and etched for 8 minutes in the perchloride of iron bath.

How it is possible that such a simple process is not adopted, seeing that it shows such eminent advantages over the present roundabout and semi-absorbing method, is beyond comprehension.

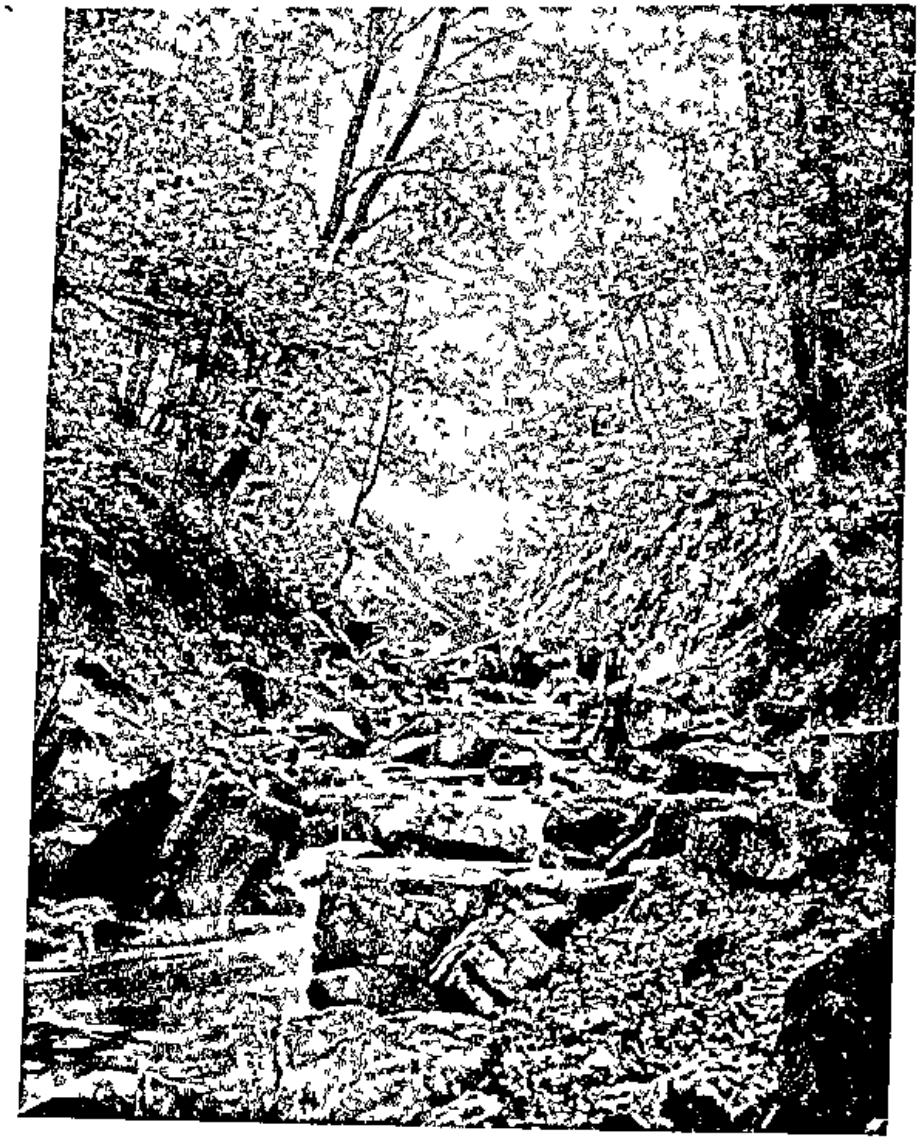


HALF-TONE BY THE SCHULZE PROCESS

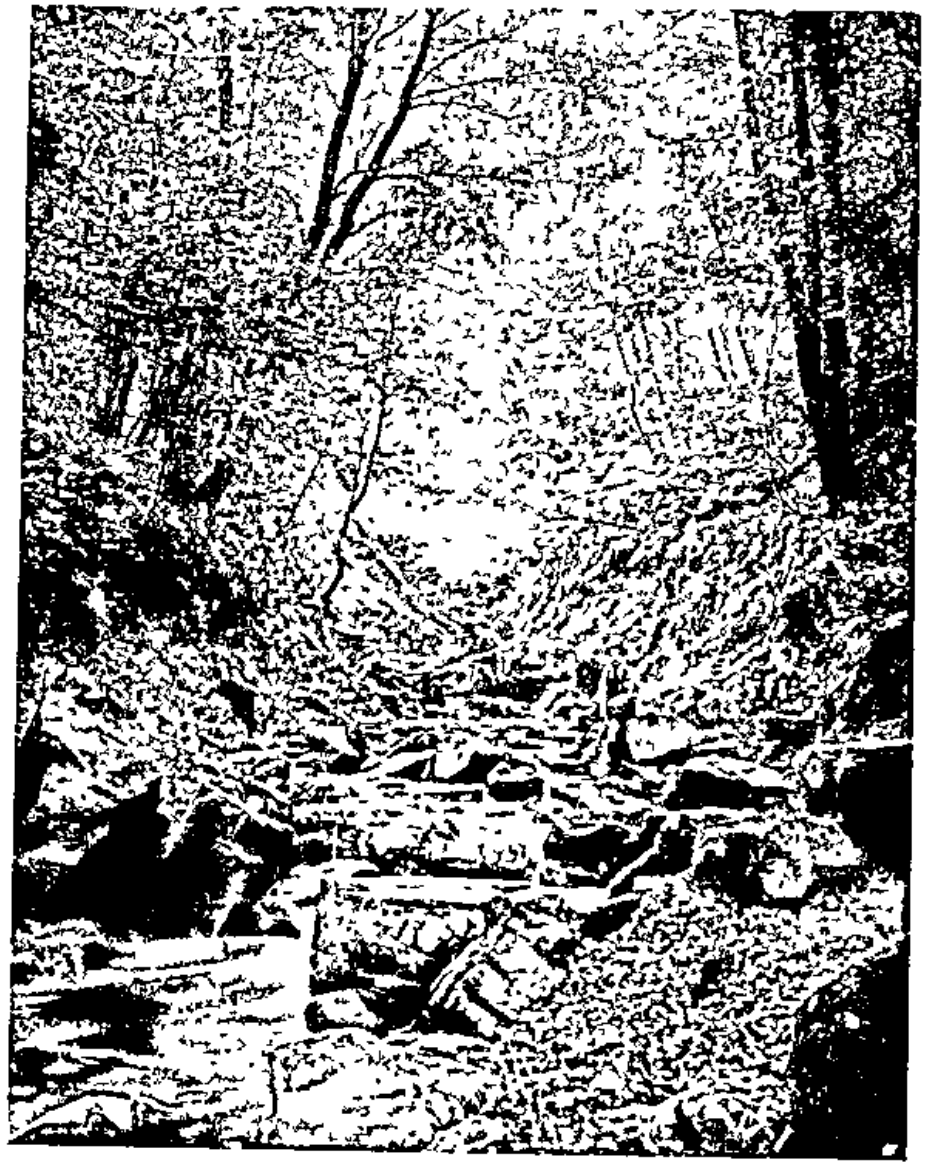
EXAMPLES OF WORK

WITH

THE METZOGRAPH SCREEN.



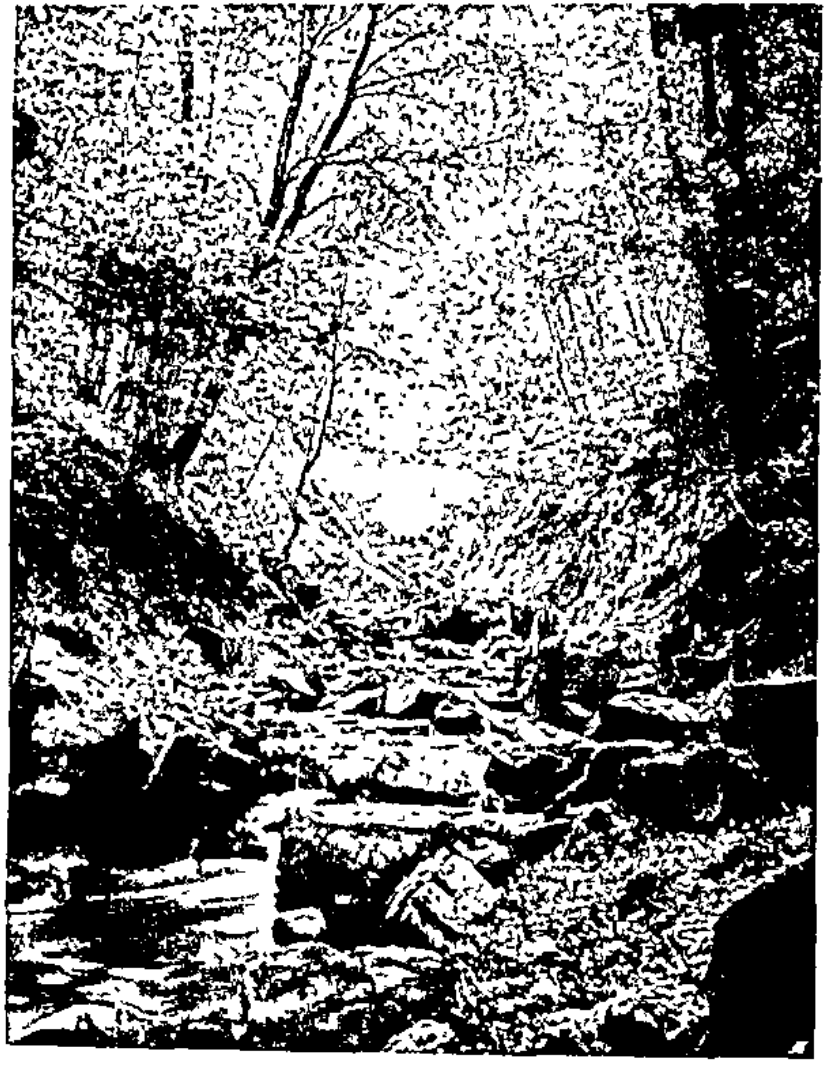
Grain No 1.



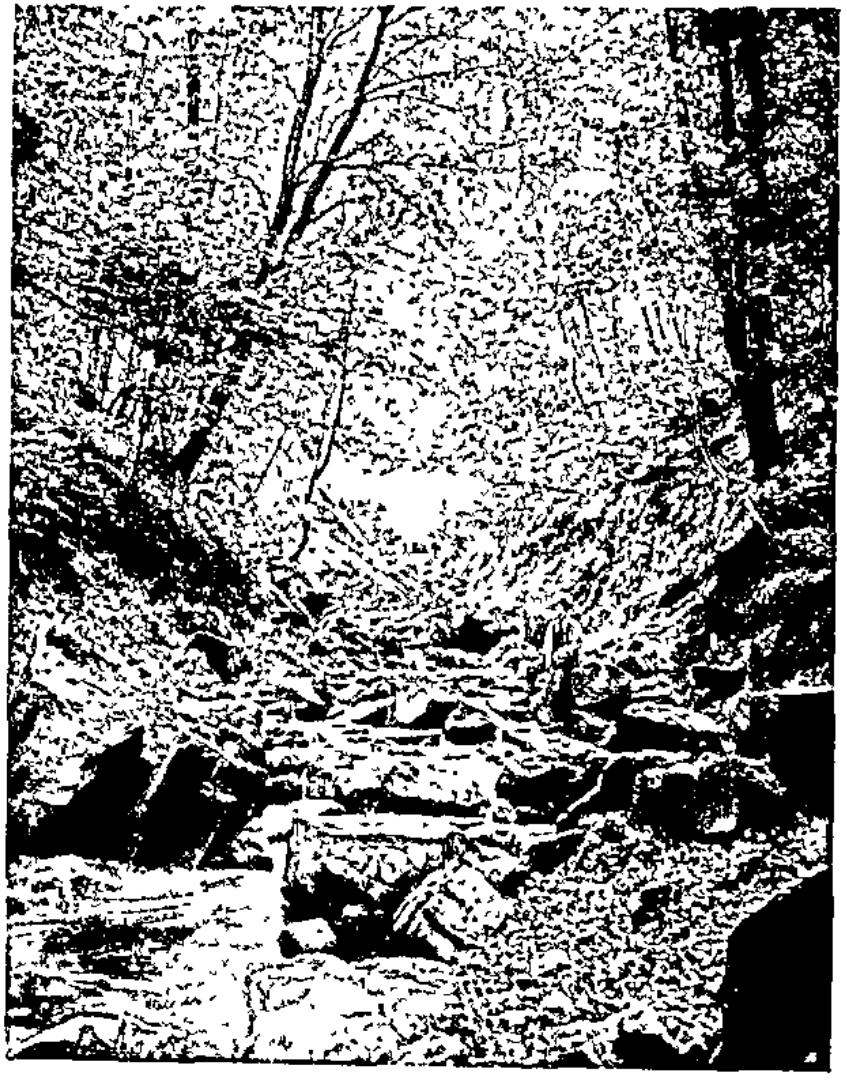
Grain No 2

EXAMPLES OF WORK WITH THE METZOGRAPH SCREEN.

Blocks by



Grain No 3.



Grain No 4

EXAMPLES OF WORK WITH THE METZOGRAPH SCREEN.

Blocks by



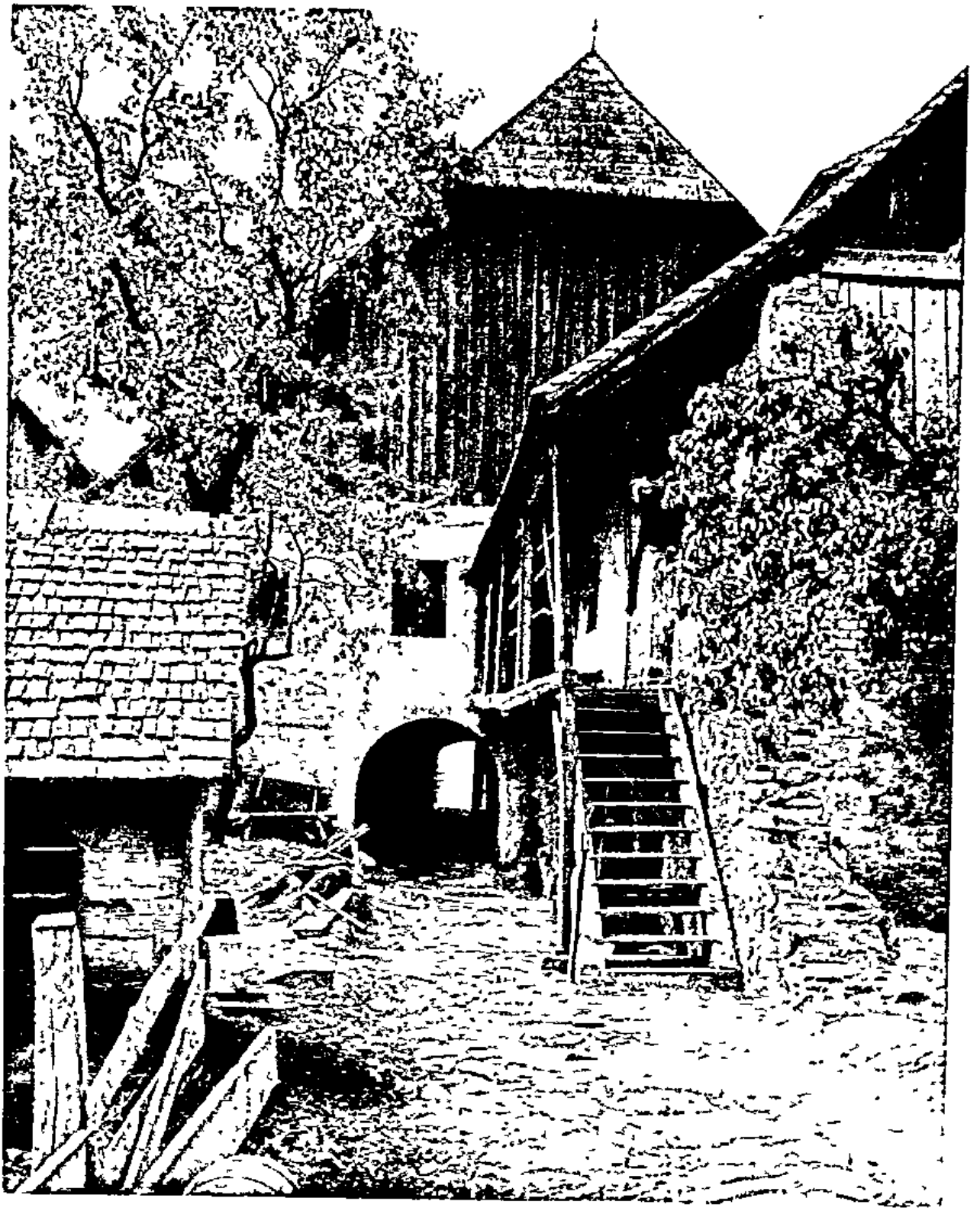
Grain No 8



Grain No 6

EXAMPLES OF WORK WITH THE METZOGRAPH SCREEN.

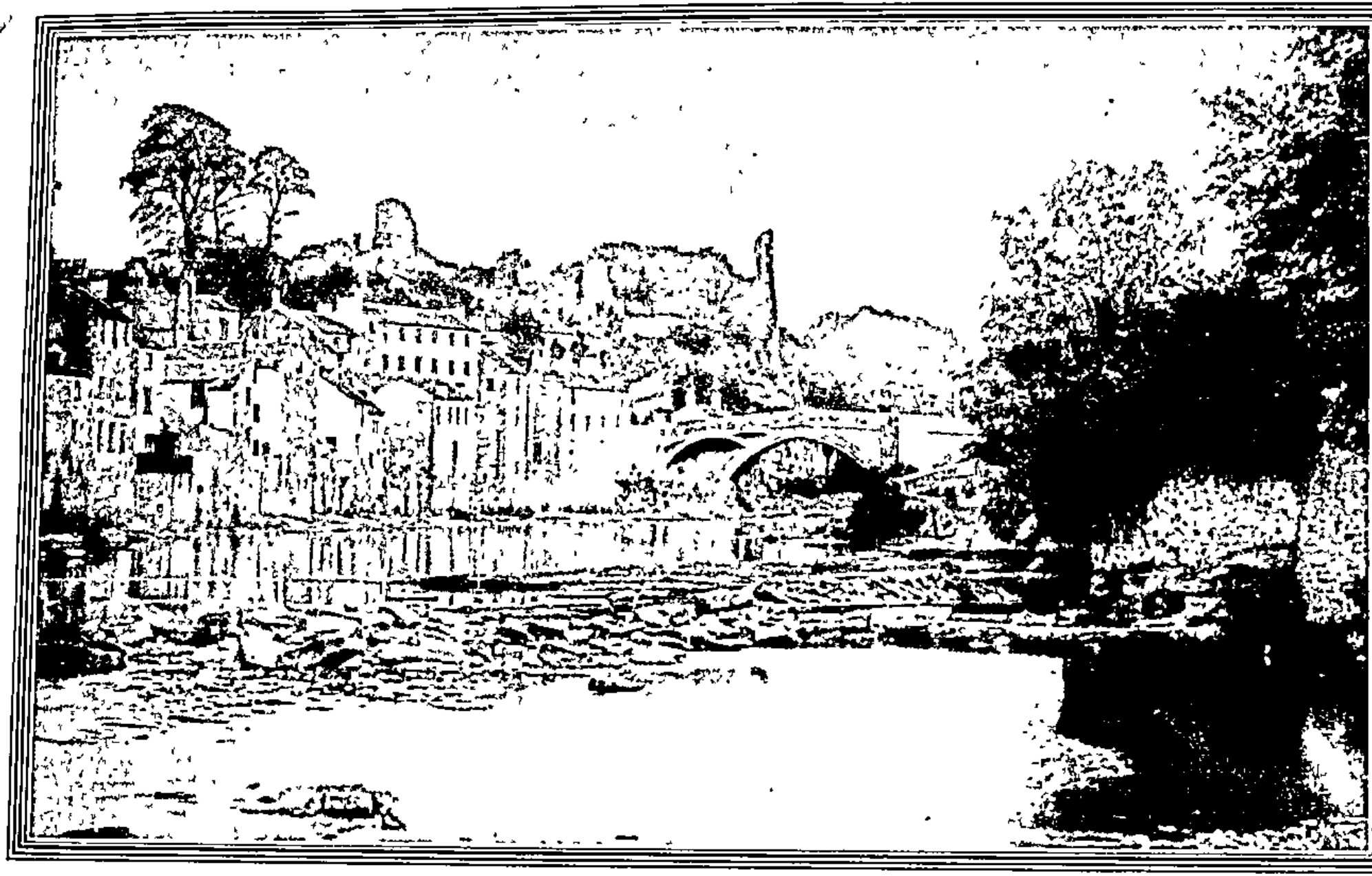
Blocks by



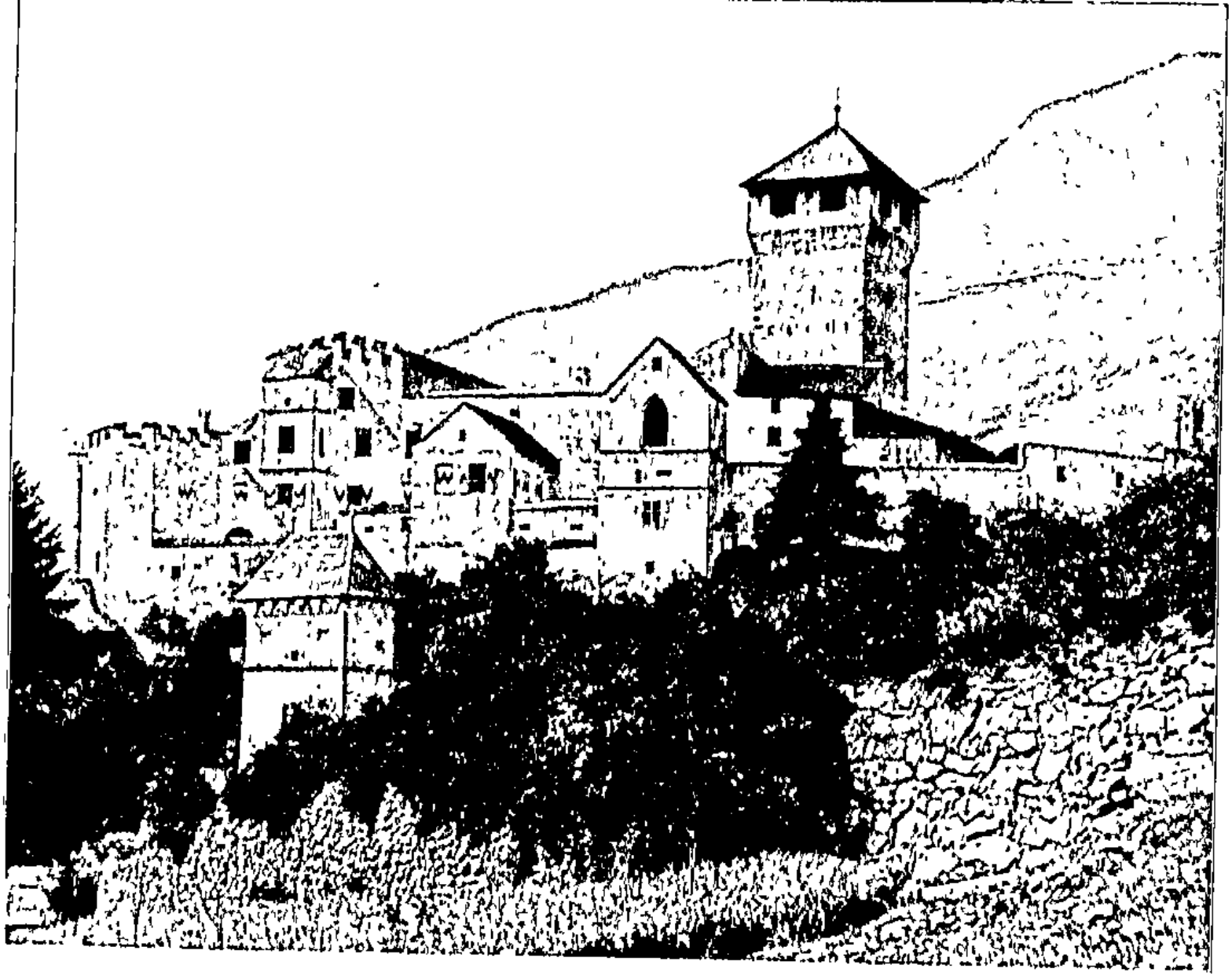
EXAMPLE OF WORK WITH THE METZOGRAPH SCREEN.

Block by
Messrs. C. Angerer & Goschl.

Made with
Screen Grain No. 4



EXAMPLE OF WORK WITH THE METZOGRAPH SCREEN.



A CASTLE IN TIROL.

Stipple Engraving by
C. Angerer & Goschl, Vienna.

Photograph by
Otto Schmidt, Vienna.



REPRODUCTION BY THE METZOGRAPH SCREEN.

Blocks by
G. Newnes Ltd. Process Dept.

By kind permission of
The Art Editor, Sunday Strand

THE ELECTRIC DRIVE.

By CHAS. HEATHCOTE, PATERSON, N.J., U.S.A.



THE OLD WATER WHEEL

Half Tone by PAWSON & BRAMSFORD — Photograph by J. C. PHYTHIAN

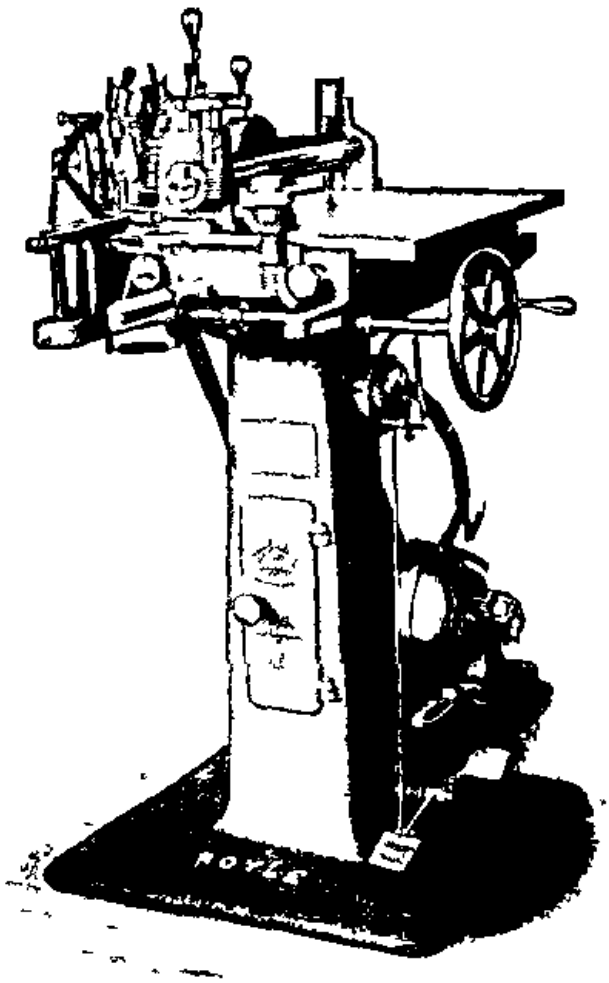
FOREMOST amongst the many problems engaging the attention of the photo-engraver is the question of tool-drive, and perhaps nothing presents more interest or importance at the present time. With all due reverence to that mighty power of steam, which has served such an admirable purpose in time past, it must be admitted that the application of electricity as a driving force has opened out many new possibilities, and paved a way to opportunities which have hitherto been more ideal than realistic. The engraver is nothing if not enterprising, and anything that can offer such peculiar advantages as does the electric drive, is bound to strongly appeal to his interest, and eventual investigation.

The introduction of electricity as a serviceable commodity in the workshop has been both gradual and cautious, but the marked success which everywhere attended the experiment quickly produced a tendency to further develop the marvellous facilities which issue from this unfathomable and mysterious power. Venturing first with electric light, this was soon found to be of such convenient and excellent service, that it was speedily followed by the employment of the current in driving machines which were not amenable to the prevailing method of drive. This proved a huge success, and the future of the electric drive was immediately assured.

The motor drive to many outside of the electrical fraternity is still shrouded in mystery, and we believe it is chiefly by reason of the fact that its wonderful facilities have not been duly recognised, that its adoption has been somewhat slow, and its movements deliberate. It is quite safe to say, however, that there is no problem confronting the engraving manager to-day which is more worthy of consideration than is the electric drive. It is now merely on the threshold of its career, and sooner or later it is certain to become the one important factor in the workshop. In this age of keen competition the engraver cannot afford to miss any opportunities of a beneficial nature, and the man is wise who takes time by the forelock. It is not profitable to be too conservative in these matters, and bitter remorse has been the portion of many a man who has hung on too long to old-fashioned systems.

The claims of the electric drive are being more and more acknowledged as a practical acquaintance of the object is developed. This is illustrated even

by the way in which the present-day buildings are being constructed. In almo every instance is a workshop building electrically wired, and connected with main public power-house of which every important city and town can now boas This arrangement provides directly for the electric drive in the work shop, ar removes the first if not the greatest obstacle in the way of its profitable adoptio When this wiring question is provided for, the remainder is substantially simpl and it should not take the observant manager long to see the beneficial resul which are going to accrue from the adoption of the electric drive.

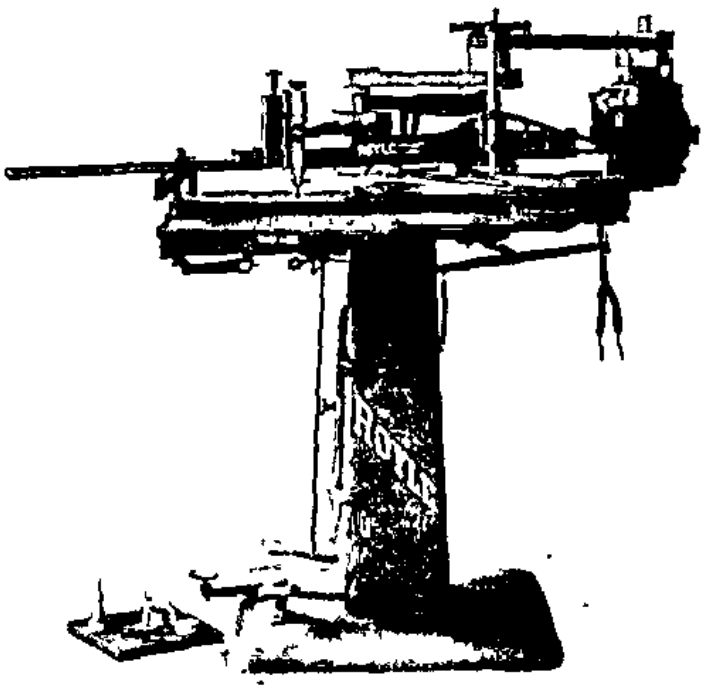


ROYLE LINING BEVELLER

As a tool-driver the motor drive is becoming indispensable, and to phot engraving machinery especially does it apply with powerful effect. There a many exceptional characteristics associated with the engraving trade whi open out a glorious opportunity for a drive of this nature, and there is no oth power so reliable or flexible in application, or so inexpensive in maintenan as that which we are now considering. A careful study of the primary elemen of this subject will reveal many startling facts in favour of the electric dri and in cost, convenience and utility, it shows some surprising results. Compa the two methods together in every detail, and the result will prove very astonishin The principal objection to the installation of electric motors by the engrav

has been largely one of expense, and the only hope of converting the objector to a proper way of thinking is by prevailing upon him to make a careful and thorough comparison of the cost of the plant electrically driven and the cost of the same plant driven by mechanical means. In doing this, close attention must be paid to the cost of belts and shafting, the supports and foundations of the same, all of which are entirely eliminated when the machines are driven by motors. This is a very broad problem, and to get at an accurate solution it is necessary to burrow through the superficial aspects, and realize the deeper and more important elements involved.

A very important feature to be considered in favour of this drive is the fact that by this improved method the extension of plant is more effectually provided for than in any other case. The progressive engraver is always alive to an opportunity of enlarging his business when circumstances demand, and here



Royle Rolter

is he assisted in his ambitious purpose far beyond his old expectations. The drive being part of the machine, he is not confronted by an array of shafting and belting when desirous of putting an additional machine in his workshop, but if space will permit, he can, with very little trouble, move his present stock to just the respective positions most convenient for the purpose, and thereby make room for the installation of his new purchase. The machines can be located solely with regard to the requirements called for, and without consideration of their location in regard to a line shaft or other prime mover. The illustrations give an example of a very unique and effacacious method of applying the electric drive. The two machines shown are the Royle Lining Beveller, and the Royle Router, both equipped with individual motors. This method is now being very extensively adopted and is pronounced by experts to be of exceptional service.

In an engraving establishment it is well known how important it is that the work be kept as clean as possible, and here again does this electric drive come forward with a forcible claim The conditions under which the employés work have much to do with the character of the output, and if the conditions are good and clean, it is reasonable to infer that the production will benefit accordingly Motor-driven machines have no overhead belting to throw oil and dirt all over the place, and by adopting the individual drive, the establishment is transformed from a grimy and overcrowded machine shop into a clean and comfortable business room.

One of the most important factors to be considered in connection with this question is the point of running expenses. Once more has the motor-drive some weighty advantages to offer, and in comparison with steam power it most decidedly comes out far ahead of its declining competitor. On the one hand the power is transmitted directly to the machine and without the use of intermediate shafting On the other hand, when steam driven, the power is transmitted through a host of shafting and belting, and much is bound to be spent in consequence Again, it must be remembered that in the case of steam power, the whole shafting of all the machines is in motion, even though only one machine is being utilized , whereas, in the case of the motor drive, immediately the machine is out of use, the power can be shut off, and so far as that machine is concerned there is absolutely no expense attached to it while remaining inactive. This is a very important item to the engraver, inasmuch as it is not often necessary for him to have all the machines running at one time. This means a great difference in the cost of power, and not only that, but it also means a great saving in depreciation.

Many other claims in favour of the electric drive might be set forth, but perhaps a consideration of those which have already been cited will be sufficient to make the engraver pause and review his own situation. Just as sure as this drive has supplanted steam in many instances, just so certain will it permanently establish itself in the engraving workshop of the future Its claims cannot be disregarded with impunity, and successful is the man who takes full advantage of profitable opportunities immediately they are presented



A Lizard

Half Tone by
A. F Dyne & Co

Photograph by
Marie Leon



A perfect hail of shot at point blank range belched forth from the twenty four guns of the larboard battery of the on-rushing ship

Two-Colour Printing



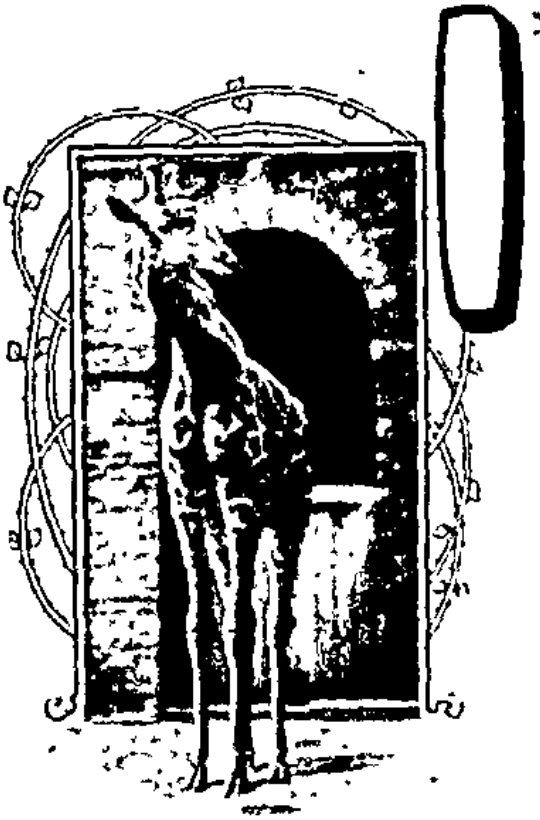
"But—oh, please let me go! I cannot marry a—a highwayman!"

Two Colour Printing

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"WHERE ARE WE TO-DAY?"

By W. HEAD.



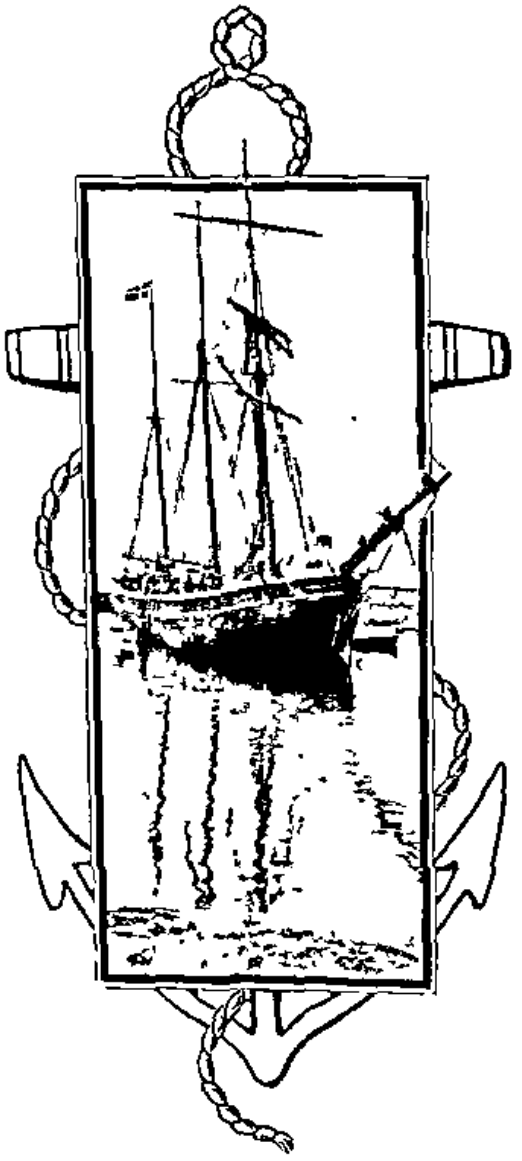
THE GREAT DEPARTED

Block by BUSSELL & LADYMAN — Photograph by ERNEST MARRIAGE

IN England, and especially in London, the electrotypers of to-day are asking themselves this question. And not without some good reason, for within the past twelve to eighteen months the stereotypers have again taught the electrotypers another severe lesson by stealing a march upon them, whilst the latter have been indulging in one of their periodical relapses into a false state of security from invasion of their right to be the ones—and the only ones—capable of reproducing cutwork, and especially half-tone cut work, in anything like a creditable manner and worthy of their honourable profession.

Now all this was foreseen by the more advanced members of the trade; in fact, a forecast of what has happened was given by the writer in one of the monthly journals devoted to the interests of the plate-making trades as long ago as August, 1903, in an article on "Stereo *versus* Electro," in which the electrotypers were exhorted to wake up if they did not wish to be outdone by their stereo comrades in the race for first place. It was seen and acknowledged before that time that what was wanted—and badly wanted, too—was a quicker method of reproducing illustrations for newspaper, magazine and catalogue work; so that the daily papers especially should be in a position to be able to reproduce their illustrations almost, if not quite, as expeditiously as they were the letterpress portion of the plate. Many improved methods for quick process electrotyping were suggested, some of which were very decided advancements on present methods; such, for instance, as the compound-wound dynamo, in conjunction with which an agitated solution of a decidedly denser gravity could be used with advantage, and shells grown in less than one hour on a mould from an ordinary size illustrated newspaper page of mixed type and cuts. Then there is the backing-up machine, by the use of which, when properly understood and carefully manipulated, one-half of the necessary straightening and stabbing up of an electro plate is abolished. But, No. "The old-time machines and methods have been good enough for nearly twenty years, and to all intents and purposes will last as long as *we* shall want to do electrotyping," was the reply of more than one. And according to all appearances they are not likely to want them for long at the present rate of progress in stereotyping. Now, "Where are we to-day?" is the question they need ask themselves in all seriousness because, just where you are to-day is *not* where you will be to-morrow. The

stereotypers are where they are to-day by the efforts and experiments they made some two and a half or three years ago, and a very creditable advance they have made in that comparatively short time. But will they stand still now, as the electrotypers have done, and are still doing in many cases? If they do they will soon lose the ground gained, I believe; for, if I know my fellow craftsmen the electrotypers, they are not a body of men to take things "lying down." As I have had some small share—I say it modestly—in developing the method of reproducing cut work by stereotyping in this country and on the Continent, so I hope to be privileged to live to do something to bring about a better state of things for the electrotypers in the near future, that is if they will kindly allow me the opportunity so to do. Advance we must There is nothing kills so surely as stagnation. Four years ago there was but one process of stereotyping cutwork, to-day there are three or four. At that time it was about level with the electrotyping process for time, as well as one mould for each cast To-day it is "casts while you wait," and as many almost as one can desire—which is generally more than is wanted—*from one mould* It is not my province here to speak of the superiority of either one or other of them, every man, of course, considers his own particular method is the best, and undoubtedly to him it *is the best.* Therefore, I reserve the right to have my opinion in the matter, and just now to keep that opinion to myself. One thing I am, however, quite certain of, and that is, the existing processes of producing stereo half-tone cuts is a long way past the experimental stage, and there is no disputing the fact of its usefulness.

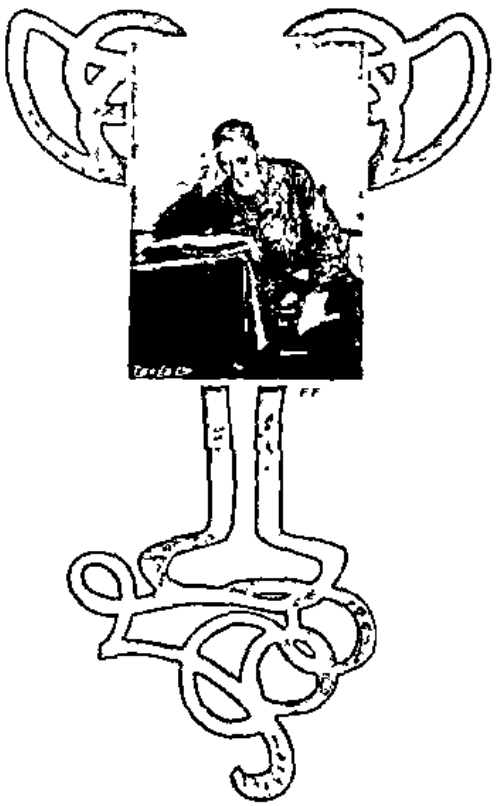


THE RETREATING TIDE

Half tone by MEISENBACH CO., LTD. Photography by THOMAS KENT.

There are a few electrotypers, and also stereotypers, who are blindly prejudiced against the more modern method of producing cut work by stereotyping and will not give the process a fair trial; yet these incompetent folks are the first to pronounce judgment against it whenever and wherever they get an opportunity of doing so. There are at least two processes by which it is practicable to produce half-tone cutwork by stereotyping. I have several specimens of work done in different parts of England and the Continent, both of my own production and by men who are working the process. So that it is only a case of "the ostrich" with men of this character. Small wonder in such cases that the employers take the business out of the hands of such drones, and place it in the hands of more intelligent go-a-head workers; even though in *some cases* the new hands are not members of our honourable society. Who is most to blame

in the matter when such things occur under circumstances of this kind ? Certainly the society as a body will not countenance any member trying to block progress in any way, of that I am sure. Yet these men, when displaced, loudly declaim against the employer for dismissing them. Better far to give the thing a *fair trial*, and if not so successful as others, then co-operate with the employer and persuade him to spend a little money on proper instruction for you. If he values your services and the advancement of his business he will be glad of the opportunity to do so. So this is where we are to-day. The half-tone stereo, when nicely and properly nickel-faced, is just now *comme il faut*. Now, electrotypers, are these things to remain so ? It is quite time you woke up, and after such a long time in which to think out and develop your plan of action I shall expect to hear something good from you. It is easy to find fault, you say. Yes, it is, nothing comes easier ; and nothing is more fruitless unless a remedy can be proposed which will act as a balm to the chafed and wounded spirit. Now, is there a ray of hope for the electrotypers in their present dilemma ? I think so. I have said in a previous contribution to PENROSE'S ANNUAL that I do not claim infallibility. I am mortal. Quite mortal. I fancy, however, that I can see a bright time coming for the electrotypers in the near future. I hope you will one and all prepare yourselves for it when it comes. If I mistake not there is a limit to which the stereotypers can go with a fineness of screen, and that is in the neighbourhood of 200. Therefore, as the demand for finer screen illustrations increases—and my experience convinces me that the demand is for finer work—the opportunity for the electrotypers will be in their ability to meet the demand. But in doing so they will need to be able to produce the work in an incredibly short time, and at present they are *not* in the position to do so. The system will need reconstructing, the methods modernized and brought thoroughly up-to-date. In fact, I believe existing methods of moulding, plumbagoing, depositing, backing up and finishing will be obsolete in half a dozen years' time if electrotyping holds any place at all in plate reproduction. What electrotypers need to-day is a place and an opportunity for experimenting. This has been denied the men in nearly every shop. "Business will not allow it," they are told. But, unless such opportunity is afforded, how is it possible to develop new ideas? In England, I regret to say, again, a man is discouraged rather than encouraged to bring forth new ideas and methods. It is more than his place is worth to mention such a thing in many a shop. He is treated as the Israelites were—called lazy, and more menial and exacting work is placed upon him; and soon all desire and energy to improve his position and his employer's business, is crushed out of such a man. On the Continent things are much better, as I said before. But the employers will have to come to this fact, and co-operate with the men to improve matters if they wish to keep their business going for profit and with success. Those who have worked upon these lines to any extent are the most prosperous concerns of to-day.



SUNDAY EVENING

Half tone by ARTHUR COX ILLUSTRATING CO., LTD

Photograph by ALF J THOMSON

And remember, a man's best days of experience and ripeness of thought ar invariably *after* he is 40 to 45 years of age, in spite of what has been writte and said about him being "too old to work at 40."

While I am writing this contribution to PENROSE'S ANNUAL—which is in th hot summer-holiday season, as all contributions to this excellent work ar "requested to be forwarded in good time for printing"—I am informed tha Mr Sherard Cowper-Coles has given an exhibition of zinc-galvanizing or platin on iron, copper, aluminium and other metals by a new process he has invente The process is performed in a retort, which is heated to a temperature of 50 deg Fahr. externally, the "bath" consisting of zinc fumes In a very shor time the articles are completely coated with a layer of zinc which penetrate to a perceptible depth into the metal to be coated. In the case of a copper ro being placed in the "bath," it was almost converted into one of brass, althoug the highest temperature attained was far below the melting point of either meta Attempts are being made to deposit other metals in a similar manner, but hav not yet reached a commercial stage. By the time this appears in print it ma have reached that stage Here may possibly be the long-looked for method producing shells in as many minutes as most electrotypers take hours to grow but, of course, a suitable mould will be needed to stand the temperature Th is the electrotypers' opportunity for experimenting Let him do his part, an find a suitable substance for making a mould with; and that too in an—a present—inconceivably short space of time. Let him push up his engineers t bring out machinery to immensely facilitate the production and finishing o of a plate; let him perfect his knowledge of how best to treat a shell when mad so as to be able to back it up in the rotary casting box without any loss of tim or labour; and I prophesy for that electrotyper a splendid future and an excelle business when the demand for fine line illustrations makes itself felt.



BIRD TREES, LITTLE EATON, NEAR DERBY

Half Tone by
BRITISH PHOTO ENGRAVING CO

Photograph by
W H PEGG



SWAN ISLAND, LOCH LOMOND.

Three Colour Blocks by
H Kollien & Co





THE ORKNEY VOLE.

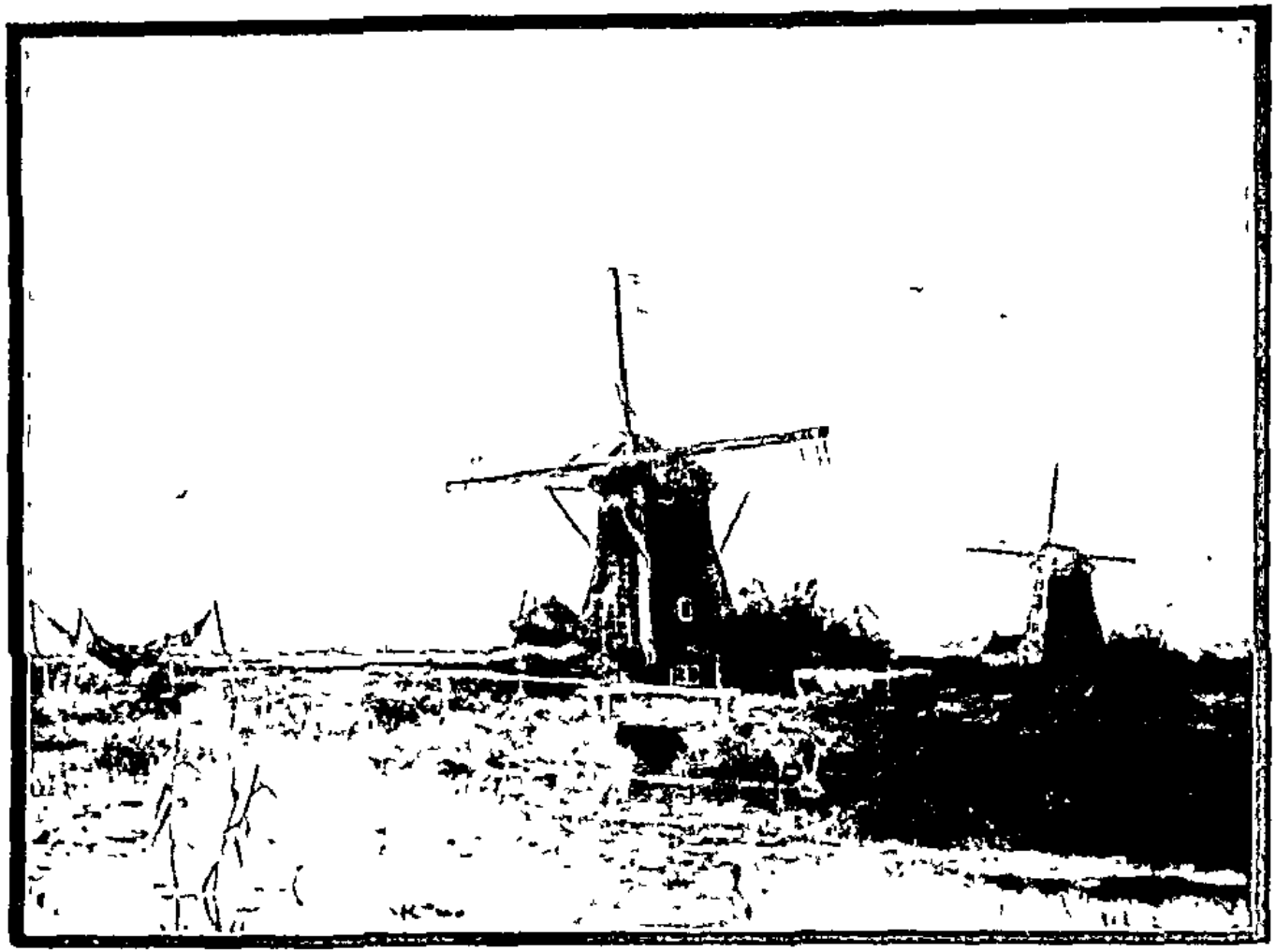
Half Tone by
W C Keene

From Photos by
Douglas English, F R P S



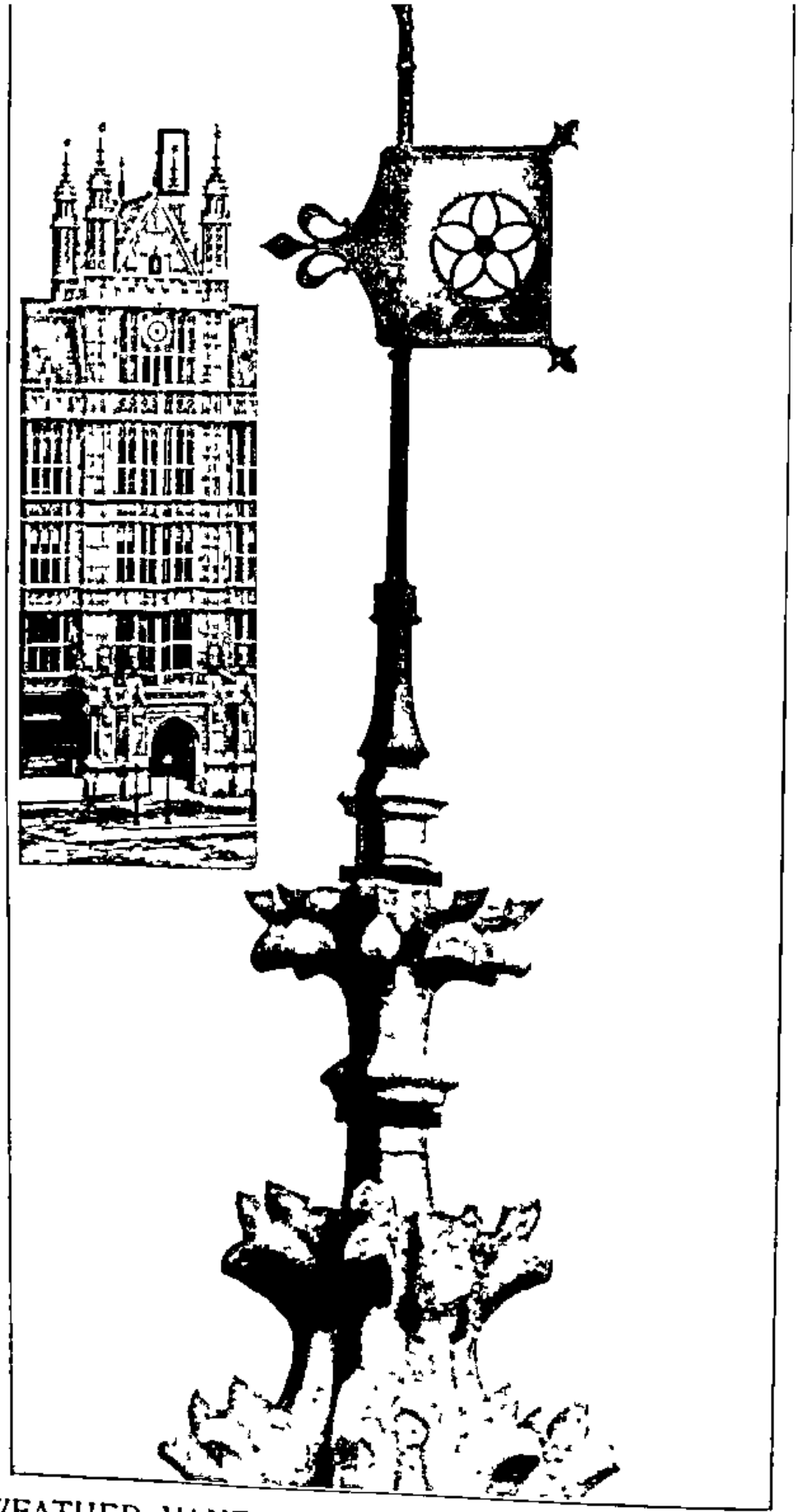
DUTCH FARM.

Half Tone by
"Helios" Rotterdam



IN HOLLAND.

Dry Plate Half Tone on Copper by
Oehr Delgeur & Co

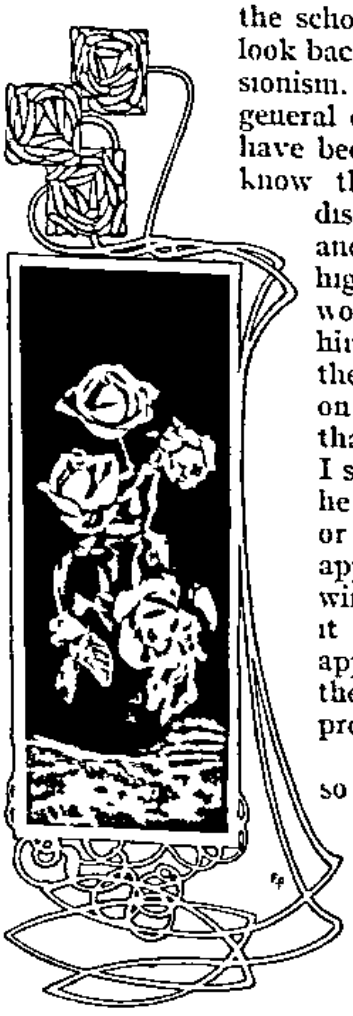


WEATHER VANE ON HOUSES OF PARLIAMENT.

Note size of vane in small view taken with an ordinary lens of 10½ in equivalent focus Vane alone taken with C P Goerz Tele-lens *35 times* magnification

Half Tone by

to discard my suspicions I approached one of them with the remark that his subject was worthy of a nobler mode of reproduction, to which he replied that such was yet to be found. I enquired if he referred to colour photography, but in reply he only asked me where I had got hold of that antiquated term. At this I could not refrain giving my eyes a rub so as to have a clearer view of my surroundings. All around on the mossy knolls there lay as if to dry what seemed reproductions of the scene before us in oil colour. Seeing my curiosity he picked up one and handed it to me for my examination and criticism I classed it as a fair example of the pre-Raphaelite school, but this view met with a spirit of indignant antagonism. In the first place, he demanded that I should let myself be understood by making reference to nature and *her* aspects I pleaded that the aspects of nature in her different moods were represented by the various *schools* But he maintained that the schools only represented half-truths and, looking back upon them now, we see only their demerits and classify them by what they *failed* to see Had we lived in the dark ages, of course, we should have been grateful for these glimmerings of light given us by the schools, but now that we live in the white light of day we look back only on the semi-darkness of mysticism and impressionism. Had the work of the schools reached such a state of general excellence as those examples before you there could have been no such distinctive features as those by which we now know the schools of history. What struck me most in this discussion was the "taken for granted air" about him, and the egotism which underlay it all seemed just as highly finished as his art specimens, so I determined to work on it a bit and see what it led to. I began by asking him to explain where the merit lay in the production of the colour prints that lay around us, but he turned sharply on me and asked if that was all I saw in them, and added that any cow on the hillside could see as much as that. I said I hadn't examined them very minutely as yet, so he requested me to take one home and do so for a month or so, and if that did not alter my opinion or deepen my appreciation I might fling my painting utensils to the winds. I suggested that before doing such a rash thing it might be as well to learn the manipulation of an apparatus such as his. He replied that if I did not fling them away before I certainly would afterwards, and proceeded to unfold the mysteries of his machine.



ROSES

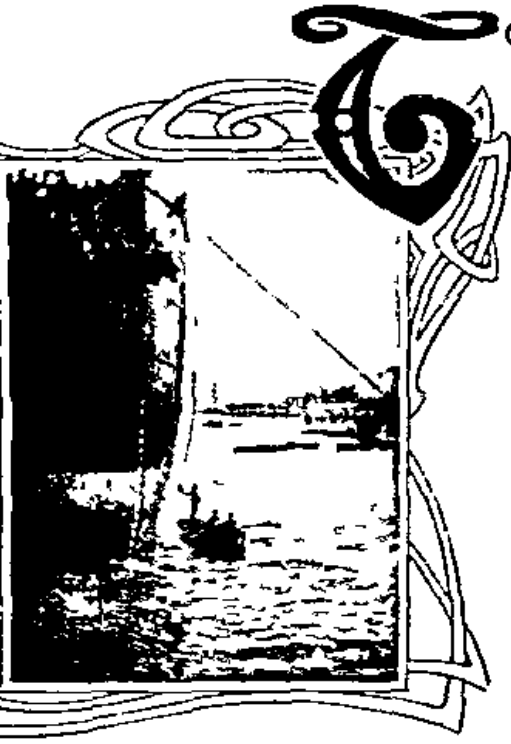
Half Tone by RHEINLANDER AND CO

Photograph by W P THOMSON

He seemed surprised, that, in conception I had fallen so far behind the times and treated me in an indulgent manner by going back to the early days of colour photography, and explaining that the difficulties which have been overcome in this particular branch of art production were, at first, looked upon as considerable, but time and brains have changed all that. Amongst all the phases of photographic colour work, that of reproducing the aspects of nature in oils was aimed at by many of the leading pioneers, and they proceeded to experiment with photo-plastic moulds reproduced from negatives taken under three-colour filters. These moulds were traced

AN ARTIST'S DREAM.

By A. MURRAY.



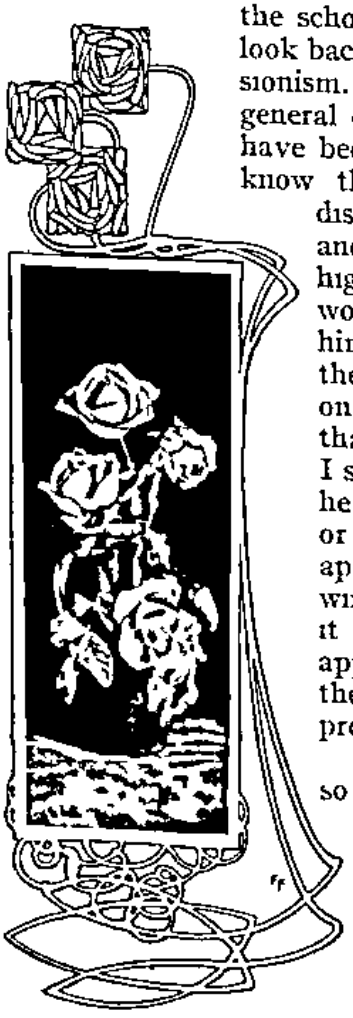
THE LAUNCH

Tone by
INLANDER & Co

TO say that I am naturally despondent, or that apprehension and dread fill my prevailing moods, is probably as far from the truth as that the present disposition of my mind is merely the exception that proves my normal attitude of being pervaded by an optimistic complacency towards things in general. However, it is something in particular that my disquieting forebodings point to. I had always relied with confidence on the security of the artist as master of his means, and I never dreamt that the day might come when a medium of art expression would be put into the hands of all who had a soul to feel and an eye to see, but who lacked the cunning of the hand to wield the painter's brush or the sculptor's chisel. Genius had been the only passport into my seclusive world, and in it I bore no jealousies and feared no compeers. That my world could expand and grow with the times nothing but a convictive revolution such as has happened to me could have broken through the crystallization of fixed principles and art dogmas with which I had become encrusted. Revolutions are seldom quite unforeseen, however, and the bounds of my stereotyped premises were so threatened with strain from outside compression as to give rise to evil apprehensions.

The sequel of my dread was to dream of it as true; my day dreams developing into sensational extremes as the nocturnal hours advanced. A great rush of colour seemed to carry me along as it shaped and blended into symmetry and harmony in its course through the dealers and the sale-rooms, and on into the sea of public galleries and private collections. This stream of colour bore wealth in its bosom, but it seemed mostly in the pools of the sale-rooms that the bait was taking, and my course did not lie in the way of these, but as dreams will have it, the progress I made was all against stream until I found myself at the fountain head of all this flood of art production. Scenes were opening out on every hand worthy of being portrayed, but always as I attempted to take colour my brush would stick to the palette and, before I could get it detached again, and my attention given to the scene, someone else had appropriated the point of vantage. Not that I could call these interlopers artists, because they were not painting the scenes—at least not by my orthodox and time-honoured method and with the usual materials. Indeed, some of them were suspiciously like photographers, judging from the apparatus they manipulated. However, the

to discard my suspicions I approached one of them with the remark that his subject was worthy of a nobler mode of reproduction, to which he replied that such was yet to be found. I enquired if he referred to colour photography, but in reply he only asked me where I had got hold of that antiquated term At this I could not refrain giving my eyes a rub so as to have a clearer view of my surroundings All around on the mossy knolls there lay as if to dry what seemed reproductions of the scene before us in oil colour. Seeing my curiosity he picked up one and handed it to me for my examination and criticism I classed it as a fair example of the pre-Raphaelite school, but this view met with a spirit of indignant antagonism In the first place, he demanded that I should let myself be understood by making reference to nature and *her* aspects. I pleaded that the aspects of nature in her different moods were represented by the various *schools* But he maintained that the schools only represented half-truths and, looking back upon them now, we see only their demerits and classify them by what they *failed* to see. Had we lived in the dark ages, of course, we should have been grateful for these glimmerings of light given us by the schools, but now that we live in the white light of day we look back only on the semi-darkness of mysticism and impressionism. Had the work of the schools reached such a state of general excellence as those examples before you there could have been no such distinctive features as those by which we now know the schools of history. What struck me most in this discussion was the "taken for granted air" about him, and the egotism which underlay it all seemed just as highly finished as his art specimens, so I determined to work on it a bit and see what it led to. I began by asking him to explain where the merit lay in the production of the colour prints that lay around us, but he turned sharply on me and asked if that was all I saw in them, and added that any cow on the hillside could see as much as that. I said I hadn't examined them very minutely as yet, so he requested me to take one home and do so for a month or so, and if that did not alter my opinion or deepen my appreciation I might fling my painting utensils to the winds. I suggested that before doing such a rash thing it might be as well to learn the manipulation of an apparatus such as his. He replied that if I did not fling them away before I certainly would afterwards, and proceeded to unfold the mysteries of his machine.



ROSES

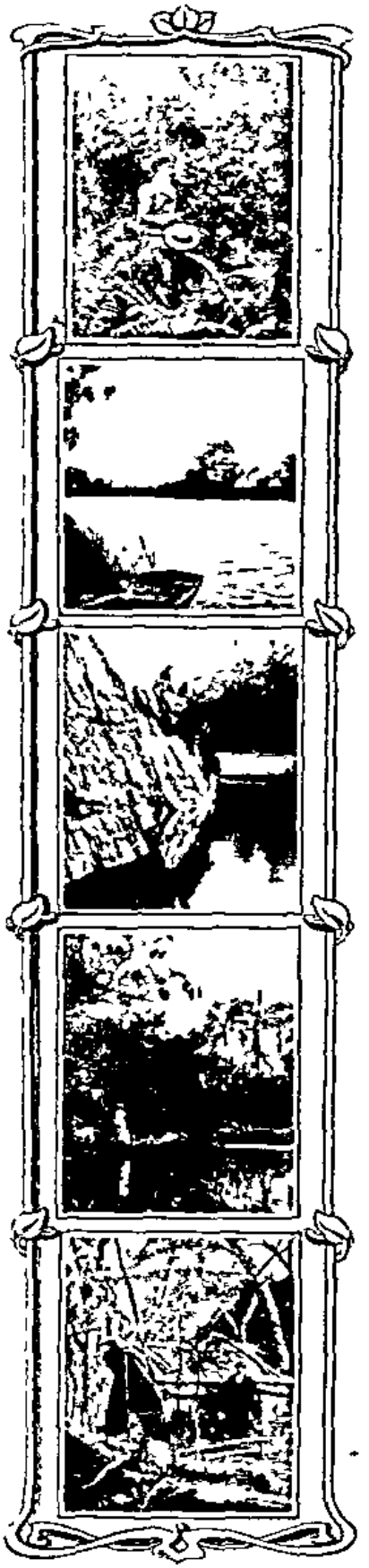
Half Tone by RHEINLANDER AND CO

Photograph by W P THOMSON

He seemed surprised, that, in conception I had fallen so far behind the times and treated me in an indulgent manner by going back to the early days of colour photography, and explaining that the difficulties which have been overcome in this particular branch of art production were, at first, looked upon as considerable, but time and brains have changed all that. Amongst all the phases of photographic colour work, that of reproducing the aspects of nature in oils was aimed at by many of the leading pioneers, and they proceeded to experiment with photo-plastic moulds reproduced from negatives taken under three-colour filters. These moulds were traced

simultaneously by pointer levers, which connected the action of colour values which regulated the supply to a brush tracer. The time this method took in execution was against its general use, and means were soon devised which overcame this and did away with the moulds and executed the reproduction within the apparatus itself by means of a light analyser which travelled over the field of vision on the focal plane, and only admitted a pencil of light. This light being split up prismatically into its colour components, these were made to act separately, according to their intensity, on magnetic attachments to the colour slot valves which regulated the supply of colour corresponding to the analyser of the pencil of light which was admitted for the field of vision. This supply of colour was traced on the canvas by a revolving pointer simultaneous to the motion of the pencil on the focal field, until all the surface was gone over. This method also took time, but the reproduction was worth it. However, the inventive faculty was still aiming higher, and ultimately the pencil of light was substituted by a spectroscopic slot which extended the width of the picture and acted like the old focal plane shutter, and with a similar sweep across the field of vision a record of the scene was taken in oil—not a mere latent image, but a reproduction ready for the frame and the Salon, that is to say, should your apparatus have caught the spirit of the scene and not merely have skimmed the surface of things. I had followed him intelligently and calmly until now, but his last remark seemed to encroach upon the prerogative of the artist in a manner which I could not let pass, so I interrupted him with the remark that the machine had no choice in the matter. He said it was not a matter of choice at all, but of faithful obedience to your artistic instinct, and if you had the spirit of the scene at heart it would be depicted in your reproduction, so responsive was the mechanism of the apparatus.

To one that was less of an artist this explanation might have been taken with calm indifference, but it so convulsed me that I knocked my heel into my paint box with such force that these pigments squirted out, and as I had thought damaged a number of his prints which lay around. However, I soon realized that no apology was necessary, as I watched him racking his apparatus out of focus and running the spoiled prints through again, while he explained that he had a few eccentric customers to supply with some examples of the Hornel type of the Glasgow school, and that a few spatters of primary

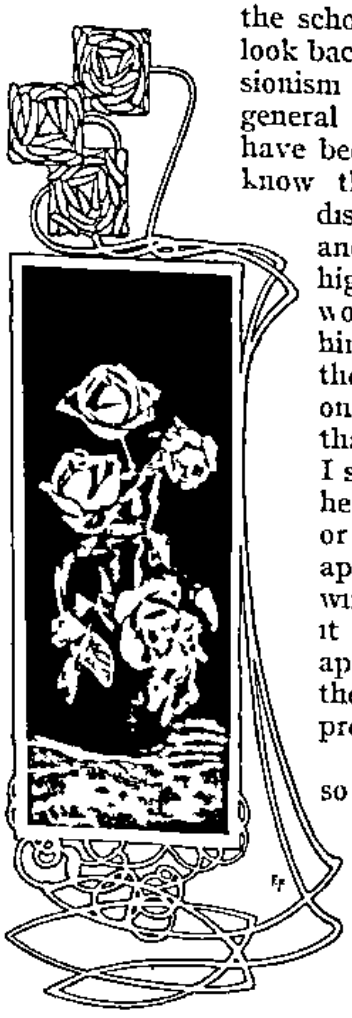


AUSTRALIAN BUSH VIEWS

Block by THE MEISENBACH CO., LTD

Photograph by ALEX HARDIE

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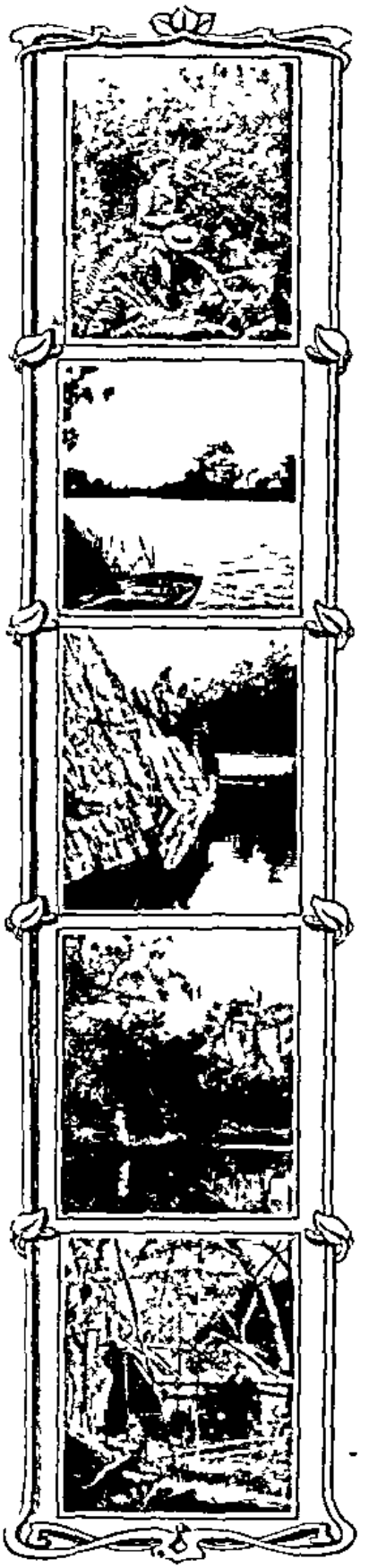
Half Tone by RHEINLANDER AND CO

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AUSTRALIAN BUSH VIEWS

Block by THE MEISENBACH CO., LTD. Photograph by ALEX HARDIE.

colour here and there didn't matter a bit when this atmospheric veil was run over them by the second insertion. He could see, however, that this hit at the Glasgow school didn't go down at all, and if it had been merely in his words I could have stood my ground, but the print he now handed to me gave dreadful emphasis to all he had said. It was now evident to him, as well as to myself, that he was slowly undermining my æsthetic convictions, and he must have read it in my face that I was looking away into a half-starved future, for he proposed that I might cast in my lot with him and become his assistant. An hour ago I would have disdained to accept the offer, but now it seemed my only opportunity in life, and I was only too glad to start at once lest he should change his mind about me My first duty was to remain and superintend the drying process, while he selected another subject for reproduction. He said he wanted to leave me in sole control of this department, so that he might judge of my capabilities for the situation. He had no sooner left with his apparatus than a slight breeze got up and blew some of the wet prints over face down on the top of others, this kept me going for some time drawing them separate, but the result was far from satisfactory, as it gave them a nasty stringy appearance, and my only hope was that he might have a class of customers to supply that were hunting after *new* schools Another trouble I had was in keeping bees and other honey-seeking insects from the foreground portion of the pictures They would settle on every vestage of bloom that was represented and, usually, before I could get them picked off, their wings and bits of legs had become detached and altogether it did not improve the identity of the flower. I had been engaged in extracting a jenny-long-legs from a dandelion, and had succeeded in putting that bloom out of all recognition, when I heard a smacking sound behind my back and, on turning about, I discovered one of the big shaggy highland cattle, that had been peacefully grazing on the hillside, chewing away at the corner of one of the prints which had represented a tempting bit of green grass in the foreground. It must have been about this business for some time, because there were a few prints all chewed up and some with the paint sucked off the lake represented in the middle distance This form of appreciation was more than I could stand, so I hurriedly gathered up all the remaining prints and made off down the hill with them under my arm, and the bull after me. On the way down we passed my employer busy at work on a new subject. A few of his fresh batch of prints stuck to my feet, but I had no time to explain matters to him. Indeed, he didn't notice me until my foot caught one of the legs of his tripod. He seemed to be on the point of saying something when his attention was diverted from me by the bull plunging its head into his camera bellows. By the time he had recovered I had got into the middle distance, where the lake lay peacefully half an hour ago, but now in such a tempest of fury that I was within the sweep of its lashing waters before I could stop. In a desperate attempt to regain land, I found myself sitting up in bed rubbing my eyes, and endeavouring to realize my whereabouts.

(Our contributor's dream is not so fantastic as it seems, for the Aerograph is now being applied mechanically and automatically to the spraying of colours through stencils to form coloured pictures, whilst gelatine reliefs are being used to operate pantographic engraving machines It seems to be a not impossible step to combine the photographic relief with tracer point, going over it to regulate the colour sprays of the air brushes.—Editor, P.Y.B.)

THE ART OF PAINTING PROGRESSING WITH PHOTOGRAPHY.

By LÉON VIDAL,

Editor of "Moniteur de la Photographie"



THE ENTENTE CORDIALE

k by HALF-TONE ENGRAVING CO., LTD. Photograph by MARTIN J. RIDLEY

AS indicated by our title, photography in colours is advancing to a brilliant destiny. Although it has often been spoken of as a fact, it is none the less true that the thing is at present to be considered as having only attained the position of requiring some years more research before we can encourage the hope, with some measure of truth, that the end has been more nearly accomplished.

The process which seems to stand before all others is that of simultaneous selection instead and in place of separate and successive selection. Evidently it will be seen, as in all simple applications, why it is, after having made necessary the employment of three distinct screens, each effective on a corresponding plate, that we arrive at not more than one operation on a single sensitive plate constituted in harmony with the three screens, reducing to a minimum of the possible surface and dispersing to infinity on all parts of the sensitive plate.

This is certainly not a new idea; it occurred to Louis Ducos du Hauron in 1869. After him came Prof. Joly, in Dublin, with his plate of multiple screens obtained by the aid of lines in juxtaposition, alternating of red, green and blue. Sampolo and Brasseur improved on this by ruling the lines seventeen to the millimetre instead of seven or eight to the millimetre, as employed by Prof. Joly.

After that came the method of MM. Auguste and Louis Lumière, based on the employment of grains of potato starch, suitably sifted and tinted to the three colour values.

A mixture of these coloured granules in convenient proportions is dusted on to a glass plate, covered with a sticky film, to which the starch therefore adheres, the granules lying very closely one to another to form a screen of three colours.

Nevertheless they could not cover absolutely all parts of the plate, the interstices between the granules being filled up by the black powder of the granulation and varnish, and consequently susceptible of replacing the spaces not covered with the starch.

There are about fifty of these granules in the space of a millimetre, which form a selective screen very much more close than that of Joly or of Sampolo and Brasseur.

MacDonough arrived at the same idea by means of a gum lac, pulverised and sifted.

Quite recently the *Photogram* published an article relative to a chromatic plate perfected by John H. Powrie, of Chicago. This plate is ruled very closely with coloured lines of 600 to 800 to the inch. Here, again, the idea is the utilization of a multiple colour screen

From these several indications regarding the employment of plates with multiple screens we see a convergence of views which is almost identical even to the details of operation. So far the method of Lumière seems to be the most likely to meet with success.

We are not speaking merely from a cursory examination of the process, but after having thoroughly looked into and admired the results, which are in every way surprising, and absolutely convincing There is no doubt, however, that a lot of technical skill is required to make such plates, and the difficulties to contend against on account of the delicacy of the work are indeed considerable But we are accustomed to believe in Messrs Lumière as being capable of accomplishing marvellous things, and we think they are in the way of realizing the crowning point of the whole of their wonderful productions. Of this we have seen sufficient to prove the possibility though we were at first somewhat incredulous. not believing that such a method of selection would lead to a truthful representation

Amongst the work of this kind which we have been shown were two examples 13×18 cm. (5×7½ inches), and these were transparencies for projection The first was an inimitable picture full of the infinite light and shade of nature. In this the sky, the sea, the verdure, and the sunlight were all rendered with extraordinary truthfulness. When this is projected by any means the effect is extraordinarily realistic.

After this we are led to conclude we shall soon be able to obtain similar results. Nevertheless, to turn out such work commercially there are many difficulties, as one can readily understand. It is evident that the plates must be coated with the various granules of the greatest purity to form the three colour values, and such plates must not be exposed to the slightest ray of white light. Moreover, this coating must be isolated by means of a water varnish of a suitable index of refraction, and this in turn receives the coating of sensitive emulsion. This is prepared by the reduction of a salt of silver, the grain of the silver being rendered as fine as possible.

Briefly, in the solution of this problem one has to take into account many factors, all of a very delicate nature, and the neglect of any one of which may spoil the operations. That is why a commercial output of the plates has not yet been attained. But when success in these matters has been reached, it will be possible to produce a photograph in colours at one exposure and with a single development.

The only drawback to this method is that it is not applicable to prints on paper. But everything in good time It will assuredly come, we are convinced, when Messrs. Lumière complete their work by giving us prints in colour. It may be that the year 1905 will pass by without these plates becoming articles of commerce, but when they are, this firm will undoubtedly be flooded with orders from all parts of the world

Another sign of progress is to be observed in M. Lippmann's process of interference photography. In a communication to the Academy of Sciences he gives the results of experiments made with a film of bichromated gelatine, the water from which has been evaporated to solid matter and fixed so as to preserve the visibility of the colours, which disappear through dessication. He

then immerses the plate, not in pure water, but in an aqueous solution of iodide of potassium. After drying the colours still exist, but are feebly visible. The iodide of potassium then remains in the plate unequally divided by the maxima and minima of interference. If now the surface of the plate in the dry state is treated with a 20 per cent. solution of nitrate of silver the colours will reappear with extraordinary brilliance. If after washing the plate it is dried the colours remain with all their former brilliance. It is established by these results that the colours viewed by transmitted light are changed to their complementaries, and the negatives thus obtained are brilliant.

The eminent *savant* concludes from these experiments that we have arrived at a time when we may obtain the same results, not only with bichromated coatings, which are of slight sensitiveness and slightly orthochromatic, but with films of gelatino-bromide, and one should be able to multiply the proofs in colours by printing in a frame in the same way as ordinary photographs. Without doubt we shall arrive at the printing by contact of positives in colour from the polychrome negatives of Messrs. Lumière.

We are bound to admit from the indications of these two processes that photography in colours is well in view, that quite important progress has been made, and that there is hope of being able very shortly by means of the ordinary operations to obtain quite artistic and delicate results.

We do not say we are on the point of a practical solution, but that the theories having been proved and demonstrated there is no doubt that the problem, still so complicated, of the selection and impression of colours, will soon be transformed into a more simple and flexible method.

In conclusion, the view that should be taken is the firm conviction that this end will be realized, for the greater honour of photography and for the gratification of the numerous amateurs who are rather tired of monochrome, and are eager to reproduce the charm and truth of colour.



A Strolling Conjurer in Cairo

Half Tone by
Carl Hentschel, Ltd

Photograph by
J. Kearney.

MAKING ENLARGEMENTS WITH THE MICROSCOPE.

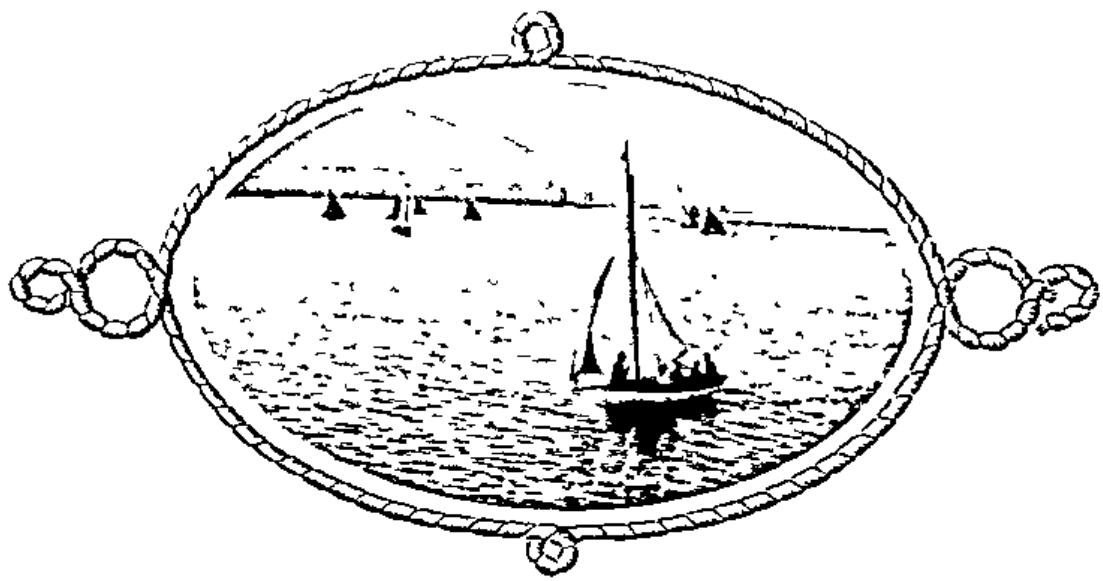
By A. E. SMITH.

THE making of large negatives with the aid of a microscope involves the same principle as the making of a bromide enlargement from a small negative.

The chief difference is that the microscope object glass is of a much shorter focus than the usual camera objective In the case in question, the animal used for a copy is about $\frac{1}{10}$ of an inch long over all. the original photograph from this is on a 12×10 plate, and is magnified 90 times linear measure, the object glass had a focus of $\frac{1}{2}$ in., and the camera extension was about 45 in The illustration is reduced from this and is now magnified 50 diam.

As the light is concentrated by condensers and passes *through* the object, great care has to be exercised to guard against halation , it is important too, to have the light central, as with an optical lantern, so as to get very even illumination all over

We have something to be thankful for that animals like these are mostly small—it might otherwise be awkward to have any contest with one even only as large as the illustration.



A FRESHENING BREEZE

Half-Tone by
T. B. BROWNE, LTD.

Photograph by
J. M. STUART



THE FLEA.

Enlargement 50 diameters

Block by (See article.) Photomicrograph by



NARCISSI.

Half Tone by
Wallage & Gillett

Photograph by
James E. Tyler



PRIMULAS.

Half Tone by
" New Zealand Mail

Photograph by
W A Taylor.

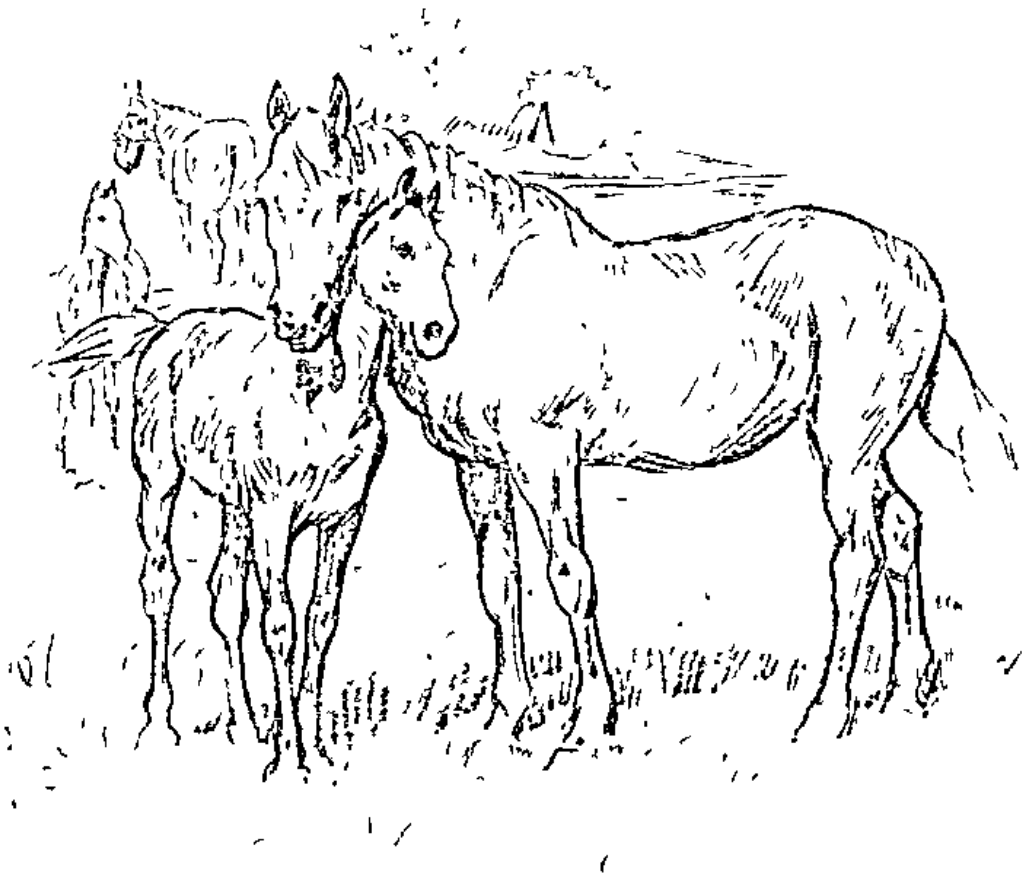


THE ANGELUS AT VOLENDAM.

STUDY OF A BLIND FISHERMAN

Half Tone by
W C Krone

Direct from Orig nal (pastel by
Gerald S Davies



MARE AND FOAL.

Block by
Dansk Reproduktionsanstalt

From a Lead Pencil Sketch of
Frants Henningsen



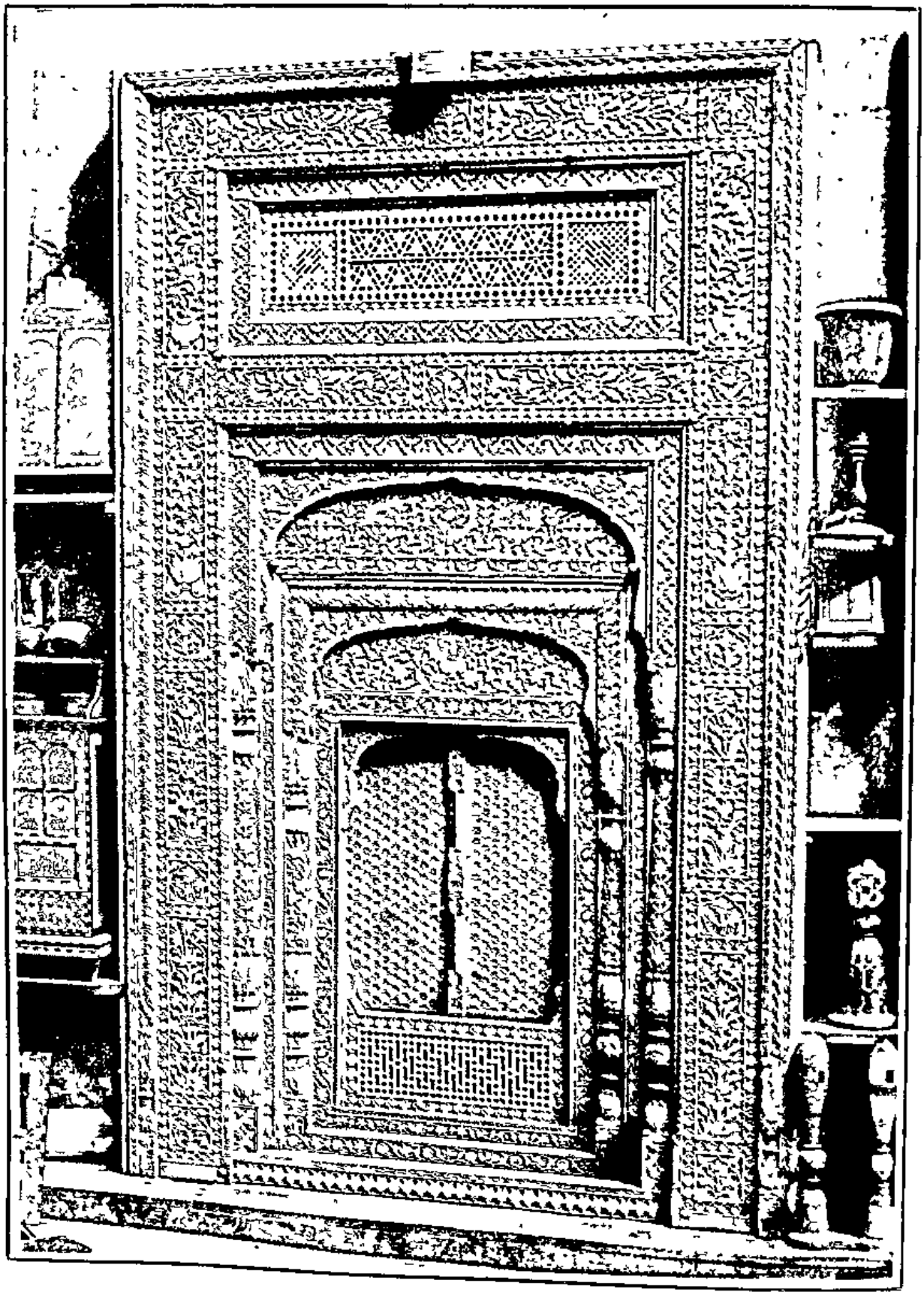
THE DESERTED HOMESTEAD.

Block on Zinc by
E J Akerman,
(Gold Medalist, Cape Town Exhibition),
Argus Co Capetown

Photo by
Ell ott



VIEW IN SHERINGHAM WOODS



CARVED WOOD DOOR FROM THE PUNJAB, INDIA.

Photo Block by the Bitumen Grain Process
made by A. W. Turner,
in the Survey of India Office

HALF-TONE BLOCKS BY THE BITUMEN GRAIN PROCESS.

By A. W. TURNER, Survey of India.



O'ER THE SHIMMERING SEA

Half Tone by ARTHUR COX ILLUSTRATING CO., LTD

Photograph by J. C. PYTHIAN

NOW that the production of half-tone blocks by the intervention of a mechanically ruled screen has reached such a state of perfection, and to a certain extent the public taste has been, by the process of seeing little or nothing else, educated to appreciate the results, the more artistic effects of an irregular grain is in danger of being overlooked. The process with which I am now dealing is simplicity itself in the few operations required to produce the block. There may be more individual skill required of the operator, both in making the blocks and printing the same, and this probably has prevented the process coming into more general use; but I think there is no doubt that the many advantages the bitumen grain process possesses and the more artistic results obtained will always find advocates in the art of illustration.

I first obtained an outline of the process from General Waterhouse, when working under him in the Survey of India offices. This was in 1887, and such particulars were from notes of a translation from the *Jahrbuch fur Photographie und Reproduktionstechnik* for 1887, giving particulars of the process as practised by Professor Roese, of the State Printing Office at Berlin. Further details of the process as since worked out by me, may now be of interest to some of your readers, and I am complying with your request to give such in your valuable Annual.

An ordinary direct negative is all that is required in this process; it may be the original taken from nature, or a copy of a print or drawing, and therefore, presuming that the negative is supplied, the first stage of the process will be the preparation of the copper plate. This should be of the best quality, well polished and free from scratches. A grain of finely-powdered bitumen is deposited on the plate in a dusting box as in photogravure. It should, however, be greater in quantity, though equally fine, and this is obtained by disturbing the powdered bitumen and allowing the coarser particles to settle before putting the plate into the dusting box, and repeating the operation two or three times according to the grain required. This is an important point in the process, as it must be understood that the ultimate image is actually formed by the varying amount of the bitumen grain on the plate. In practice I have proceeded as follows:—

About two or three pounds of very finely powdered bitumen is placed in the dusting box and disturbed by blowing up the same into a cloud of dust. The

coarse particles are allowed to settle for two minutes, the plate is placed in the box and left there for one minute, it is then removed and the operation repeated a second and third time This will give a large quantity of a very fine grain. such grain being fixed to the copper plate by heating it over a stove , care should, however, be taken that the heat applied is not too great, as this, if carried too far, spreads the grain and makes it coarse

An ordinary print in carbon tissue from the negative is developed on the grained copper plate. In practice I have used the Autotype Company's Standard Brown Tissue for this purpose, but it is possible that a special tissue more suitable for the process could be made The positive image thus obtained, when perfectly dry, is etched with two and sometimes three solutions of perchloride of iron. I never use more than three, and generally find two sufficient; but this depends to a great extent on the moisture of the atmosphere, and in a dry climate it may be necessary to use a greater variety of solutions I have found three solutions of 44°, 40° and 38°B sufficient for all practical purposes With a little practice the progress of the etching can be watched, and should be carried far into the deepest shadows, otherwise the subsequent rolling up of the image with the re-biting ink is very difficult The gelatine image is now cleaned off as quickly as possible, and the plate cleaned with a mixture of chalk and liquid ammonia. It is then ready for the most important and delicate part of the process of re-biting the image to a sufficient depth for printing purposes.

The process of rebiting, on which the whole success of the work depends, requires a very fine ink, free from granularity, with great power of resisting the etching fluids and one that will distribute evenly over the plate. The ink recommended by Professor Roese I found was not sufficiently strong, and after many experimental trials I found a composition suitable to the requirements of the process. This consists of a mixture of bitumen dissolved in boiling turpentine to which is added, after solution, a large percentage of wax; this being intimately mixed, which requires considerable care, a quantity of boiled oil is added gradually. The result is a stiff paste which has to be reduced to the consistency of a cream with benzole. This ink, having no colouring or granular matter in its composition, forms a perfect resist to the perchloride in the process of re-biting. With a good roller, for on this the whole success of the process depends, the re-biting ink, forming a powerful resist, can be evenly distributed over the first etching and sufficient depth obtained in a single biting. I have worked at this process for many years, and it was for the object of obtaining a perfect roller for the process of re-biting, in which undoubtedly lies the whole secret of success, that induced me to bring out my pneumatic printing roller, which possesses the very essentials required. This, with the re-biting ink, particulars of which I shall be glad to give your readers, renders this process one of practical use. The re-biting ink requires some considerable skill to mix perfectly, but I feel sure that if Messrs. Penrose see that there is a sufficient demand for it they will make arrangements to place it on the market.

The block, when etched to a sufficient depth for letterpress printing, is treated as regards trimming, mounting, etc., exactly as an ordinary half-tone block by the mechanically-ruled screen process.

PHOTO-CRIMINOLOGY.

By Dr. Henry E. Kock, A.M., LL.B., Cincinnati, O.



Inquisitiveness.

Block by A. E. Dent & Co. Photograph by J. M. Stuart.

THIS science that may seem new to many photographers is coming more and more into prominence, as its importance is being felt and its development approaching perfection.

To the vast majority photography is an art, and that only. To others who are more deeply interested, especially in the reactions that the photo-compounds undergo, and who study the relations of actinic substances to developers and fixing compounds, the halogens to the haloids, of the colour-sensitizers to emulsions, to these, aside from the artistic and æsthetic in photography, it becomes a technical science.

As in natural philosophy action and reaction are equal and opposite, so do we find in photography the good of an advancement counteracted by the application thereof to evil.

Photography then is used for criminal purposes, for photo-reproduction of notes, etc. With the introduction of colour photography the difficulty of copying bonds, money, and other multi-coloured documents was removed. The gelatine-relief process afforded a quick and simple method of producing dies for coins, medals, etc.

Conversely, however, photography was again utilized in detection of crimes; the differential, to the eye invisible, activity of surface denundation on forged or raised notes; the colour reaction of figures and letters removed by acids and alkalies. These and many more were detected by aid of the camera that had remained unnoticed before.

From the above we have an indication of the size of the field covered by photo-criminology, that from its function is divided into two groups:—

1. Application of photography for criminal purposes.
2. Photography in the detection of crime.

It is, of course, quite impossible to give in a short article a complete survey of matter that in completed form would fill a work of several hundred pages. Still, a fairly complete outline of the subject is contemplated here.

I. Photography employed criminally.

A. Original photographs in which the photograph in itself is but a means to perpetrate the crime.

1. As a means of reproduction.
 - *a.* Documents, as bonds, money, stamps, passports, etc.
 - *b.* Coins, medals, etc.
2. As a means of incrimination.
 - *a.* Production of photographs for blackmail, etc.
 - *b.* Manufacture of photographs by altering or changing and adding or retouching.

B. Photographs in and of themselves criminal.
 1. Against public morals
 2. Infringement of copyright
 a. From a moral view-point, such as imitation, either as to subject, pose, method, technic, effect.
 b. From a legal point of view, or an infringement of the letter of the law, as copying paintings, original photographs, original designed post-cards, etc.

II. Photography as a detective of crime, chiefly as a means of evidence, and divided into three groups
 A. persons, B places, and C things

A. Persons —
 1 Photographs of persons for purposes of record and measurement.
 2 Photographs showing poses, conditions, environment, for alibi, or otherwise

B Places —
 1. Site of crime, conditions, etc
 2 Purposes of measurement.

C Things —
 1 Object of crime
 a Articles stolen, etc.
 b. Papers, documents, altered or changed.
 c Photographs showing alterations.
 d. Photographs showing methods.
 2 Objects as means of crime, instruments, etc.

The above is but an outline of the subject and may in some parts be incomplete, but for the present purposes is a good nucleus about which the complete study can soon be constructed. This subject is more of interest to the technical or process photographer, who has a better command of photographic method, than the "artistic" photographer, who is solely interested in lighting and pose.



THE POULTRY RUN

Half-Tone by
PAWSON & BRAILSFORD

Photograph by
MARIE LEON



CYRIL MAUDE IN "THE LITTLE MINISTER."

Half Tone by
W. C Keene

From a Drawing by (the late)
J. Gulich, R I.

ten people stopping-out, etching and fine etching. This is away out of proportion, is it not? Do you wonder that they fail to make a profit. The operator in such cases gets about £1 10s. per week. It serves the firm right, if they paid a good man £3 to £4 then they would not need half the staff in the etching-room. Altogether too much handwork is done on plates in some English shops, and its only due to bad, bad negatives. The system of having a flat dish to put your silver in is all right, but the dipping bath is faster and more practical The largest flat silver bath that I saw was about 5×6 feet; it contained 9 gallons of liquid silver and had 120 ounces, or 7½ pounds of silver in it. This bath I saw at Alf Cooke's, Leeds, whose process department is in charge of that bright and brainy little fellow Guy Symmons I admire your cameras above all and can truthfully say they are superior to ours in America. The screen being in the camera makes it simpler by far, and has the advantage of avoiding screen sweating, as the screen is not carried from the operating-room to the dark-room as in our country, and there is a smaller risk in breakage. In regard to dry plate negatives I will say that I have handled some splendid ones while in England and you are ahead of us in that respect My contention is that dry plates are feasible by all means, but one must have a great deal of practice and have the support of a good printer. I found them quite easy to print from, and the results were as good as with the regular method, it is simply a matter of getting a method and then sticking to it The same is the case with emulsion, you educate yourself into its use, and you can get bright and crisp negatives. Those who get fuzzy and unsharp negatives don't know their business An operator must leave everything aside if he goes in for emulsion, so that he can concentrate his mind on it. One must not expect to leave it all to the operator either; an experienced fine etcher is needed, one who knows colour values. Without the assistance of a fine etcher one need not expect results. I saw one instance where a fine operator came from a big firm to a small one; he could not turn out three-colour work because he had no proper support. The man lost his position, as they thought he could do all the work himself. London practically supplies three-colour blocks to all of England. There are several good firms out of London, such as Benrose & Sons, Dux Engraving Co., *Manchester Guardian*, and Alf Cooke, which do perfect three-colour work. In my estimation Alf Cooke, of Leeds, does the best colour work out of London. I trust that no offence is given by that statement, but from what I actually saw that is my opinion. In London, Carl Hentschel excels in colour blocks by far, the others not being fortunate enough to possess such good men as he. In regular half-tone work that of Tillotson and Sons stands absolutely at the very top; the very best artists in England are employed there to touch and work up photographs. That is no doubt the secret of their success, together with the fact that they print their own blocks. Now, as regards etching, every firm, without even one exception, that I came across use the dragon's blood process in England. Good for John Bull. Bravo England. At last you are convinced that the four-way powdering process is superior, and you are now neck-and-neck with the best of them, believe me, and in colour work you have passed the wire *à la* Cicero, Cherry Lass and Pretty Polly fashion with us Yankees, getting a good view of the race from behind. Somebody should give me sixpence for that, but it is a fact; in colour work you have but one superior, and that's the German, but as for us Americans you have beaten us. My prediction is that in another 5 to 8 years you'll catch the Germans, but you'll have to hustle, as the German is a great student and is great in research. Still, with the many technical schools all over your empire, it is bound to improve the coming generation of process men. I myself am in favour of such schools, though I

regret to say our country has but one such school, and that is not very popular for reasons that are better left unsaid. Schools are not detrimental to one's education as far as I know, though some say they do one no particular good. Even if they do not turn out finished workers they have at least a thorough knowledge of what they are doing, and the why's and wherefore's thereof, which gives them a great advantage over the mechanical process worker in a very short time. One of the nicest technical schools that I visited lately was the one in Manchester. It is a splendid institution, one that can compare with the best of them. This school is very up-to-date in all apparatus needed for our work. Mr. Charles W. Gamble is its head instructor, and though he was away when I called, his assistant Mr. Fishenden, showed me around. I want to say a good word for the instructors in England. I don't say it to curry favour with them by any means, but though most of them know my dry developing enamel process not one of them will teach it to their pupils, they are too much of gentlemen to interfere with a secret process, especially if the man makes his bread and butter out of it. I wish I could say the same of the Germans and Austrians, who pick every man to pieces and attack his process and try to explode same. So far neither of the long-titled gentlemen who are professors in Vienna have hit upon the right thing, and I hope they won't. As a rule a process monger is not in favour in Europe, but if there were no such people travelling about and teaching I should feel sorry for our profession. Trade seems brisk, with as far as I can see plenty of employment for everybody. Employers must be making money notwithstanding that prices are low. That is a certainty, when one considers that some process engravers get 3 to 5 dollars per week; starting at 4 shillings first-year, the poor devils are apprentices, of course, but then process engraving can be learned quickly, say in 2 years. Then he has 3 years to go on starvation wages, then 8, 12, 16, and 20 shillings the fifth year, advancing at the rate of 4 shillings per year. It is a very nice thing for the employer. For my American readers I will put it down in U.S.A. money. Begin at 1 dollar per week and advance 1 dollar each year; in 5 years he gets 5 dollars per week, then he begins to roam around as a journeyman earning from £1 to £2 10s. per week at most. While process engraving is fully understood in England, it will surprise some to know that there are still a few engaged at it who are away behind the times; for instance, I ran across a firm in a large English city who uses common street lamps for printing on metal, and negative making taking about a full half hour to make one negative, and the same time for printing on the metal. A great evil that one finds in this enlightened age is the use of bichromate of potassium instead of bichromate of ammonium. This has been my worst contention so far; firms who have taken up my process have had it go wrong simply by using the potash instead of the ammonium, both looking alike in substance but having distinctly separate chemical actions. Bichromate of ammonium is a bright orange, potash dark, and heavy and dissolves very hard. Ammonia is much lighter in substance, and more flaky and dissolves quickly. Another thing I noticed lately, and that is I crack more negatives and have more prints out of contact lately than I did five years ago. Someone is selling a very poor quality of metal, scratchy and very uneven, actually wavy. Now I will say this much, it does not come from that wide-awake and enterprising firm of Penrose. I don't have any more use for Penrose's than they have for me, but I say this, when I want some firm to get some pure chemicals, good apparatus, in fact something that is reliable, put me down for Penrose, the hall mark of excellence. Too confoundedly dear they tell me, but remember in process work the best is the cheapest. I never heard of a lot of their bichromate of ammonium turning out to be potassium, but I did

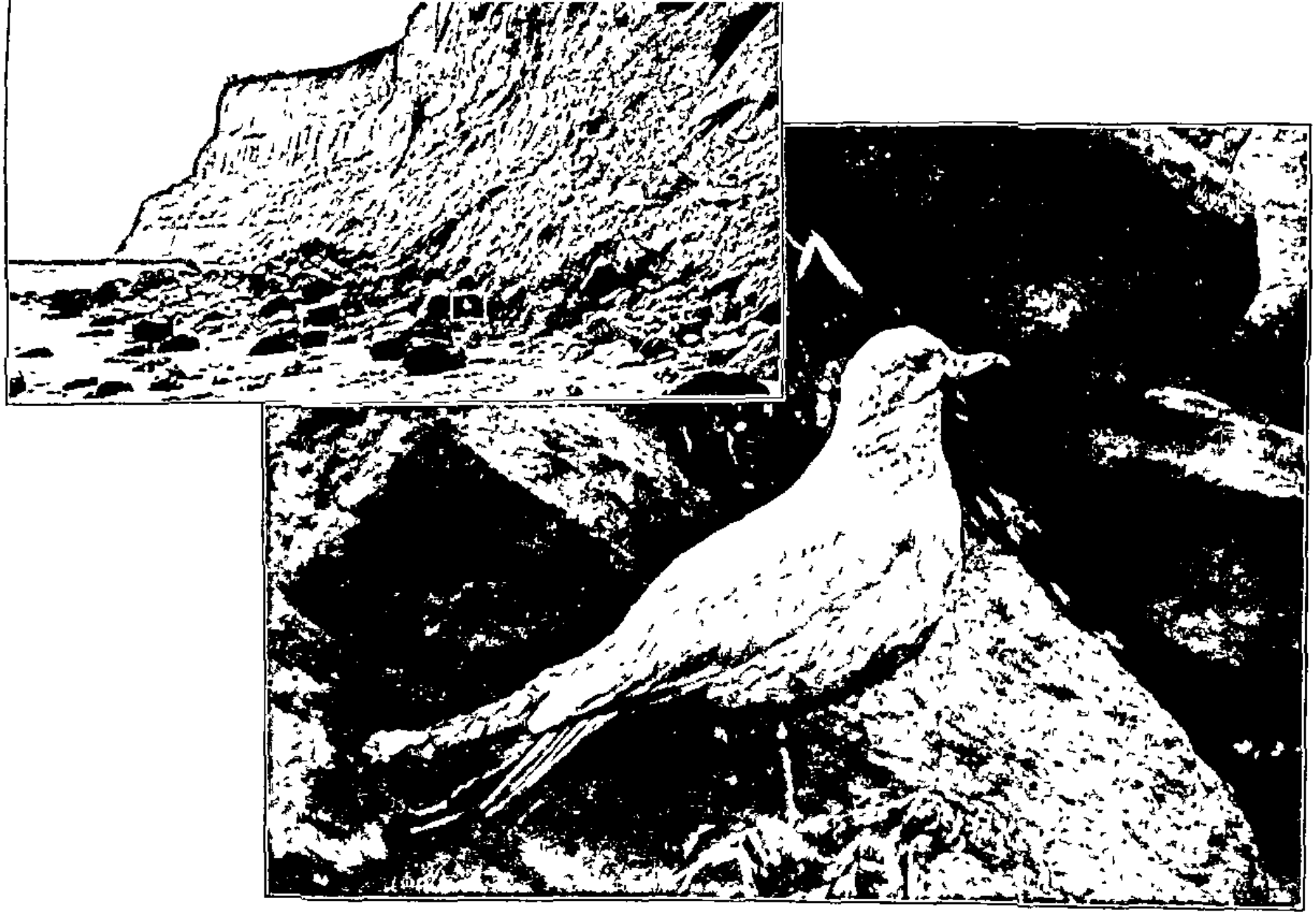
know it to be done by another supply firm. A few words to line etchers before closing. Many of you do not quite understand its drawbacks in connection with dragon's blood. Here are some pointers to overcome them. Get a good quality of blood, then only dump about ½ lb. into the box and sift it each week through a sieve made of brass wire, say 80 holes to inch ; that will keep all coarse powder, hair from brush, grit, and chips of wood and mortar in the sieve, and that you throw away, then your powder is fine and soft If you have any powder like some of that given me on my recent tour and after, I etch a plate all away I am told "that dragon's blood was bought 3 years ago." Get rid of it at once, throw it away, another fresh lot will work at once without any trouble. Also get special powdering brushes; those that I have been given with 12 or 15 hairs in them are not sufficient to brush flies off the plate, to say nothing of using them for powdering hard against the relief lines Europeans who are contemplating going to America will find it a very unfavourable time just now, things are somewhat strained between employers and employees, and though I am fully aware of the situation, from both the respective sides, I prefer to mind my own business I advise young men to wait till the pot ceases to boil, which it soon will do, perhaps in the spring of 1906, the coast will be clear. Hard workers are always wanted in the U.S A. and Canada, and there is room for good men in all trades One large firm who wanted to launch out in one of our American cities, that is to run branches in two or three cities, remarked that the money was at hand but "we cannot get the men." That will give you some idea of the absurdity of the talk of engravers being a drug on the market.

In conclusion, I would say let everyone of us during this coming year do our very best with a view of further advancing our craft. There is more room for improvement. Remember that process engraving is not perfect by any means.



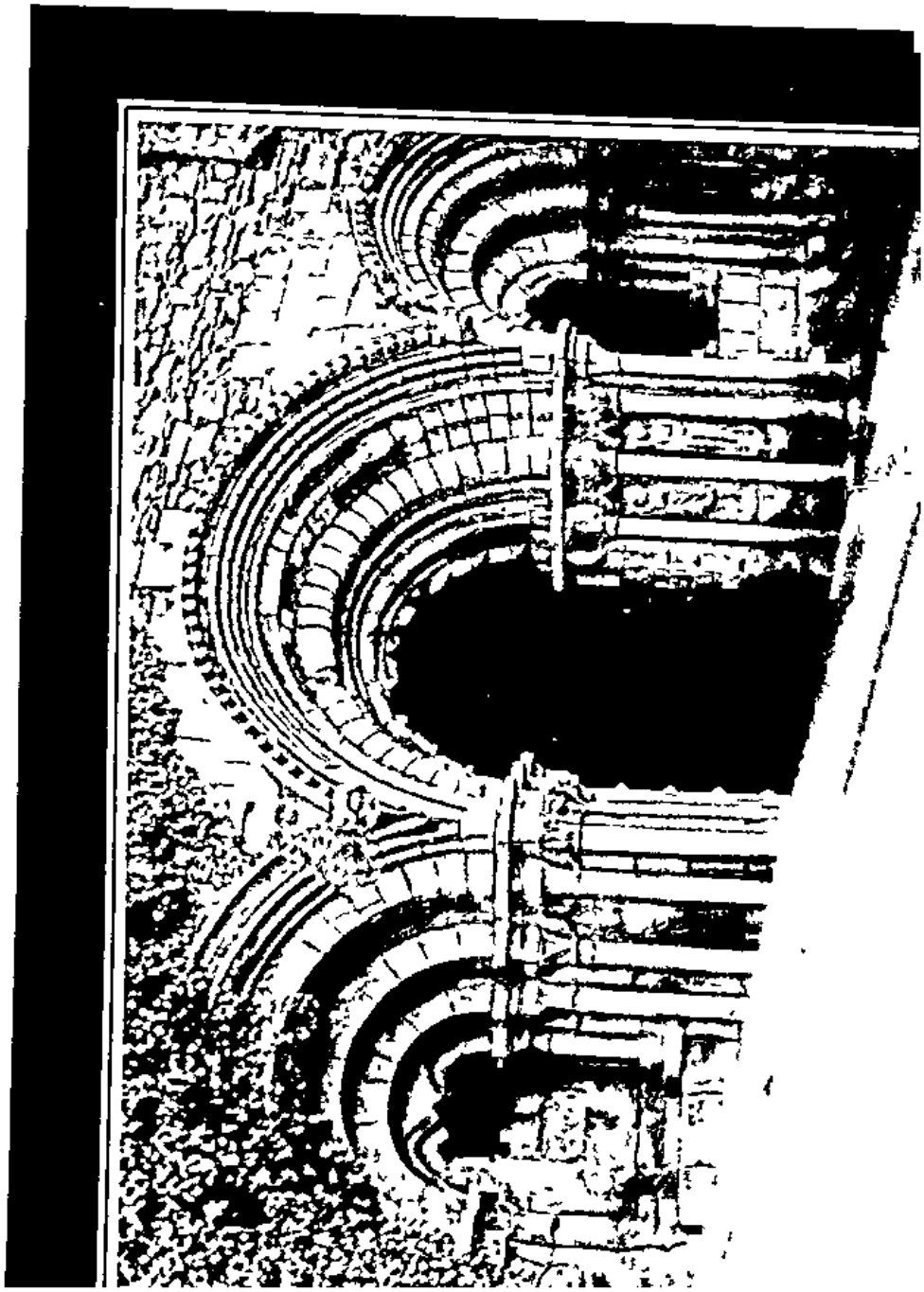
In a Calm and Quiet Bay

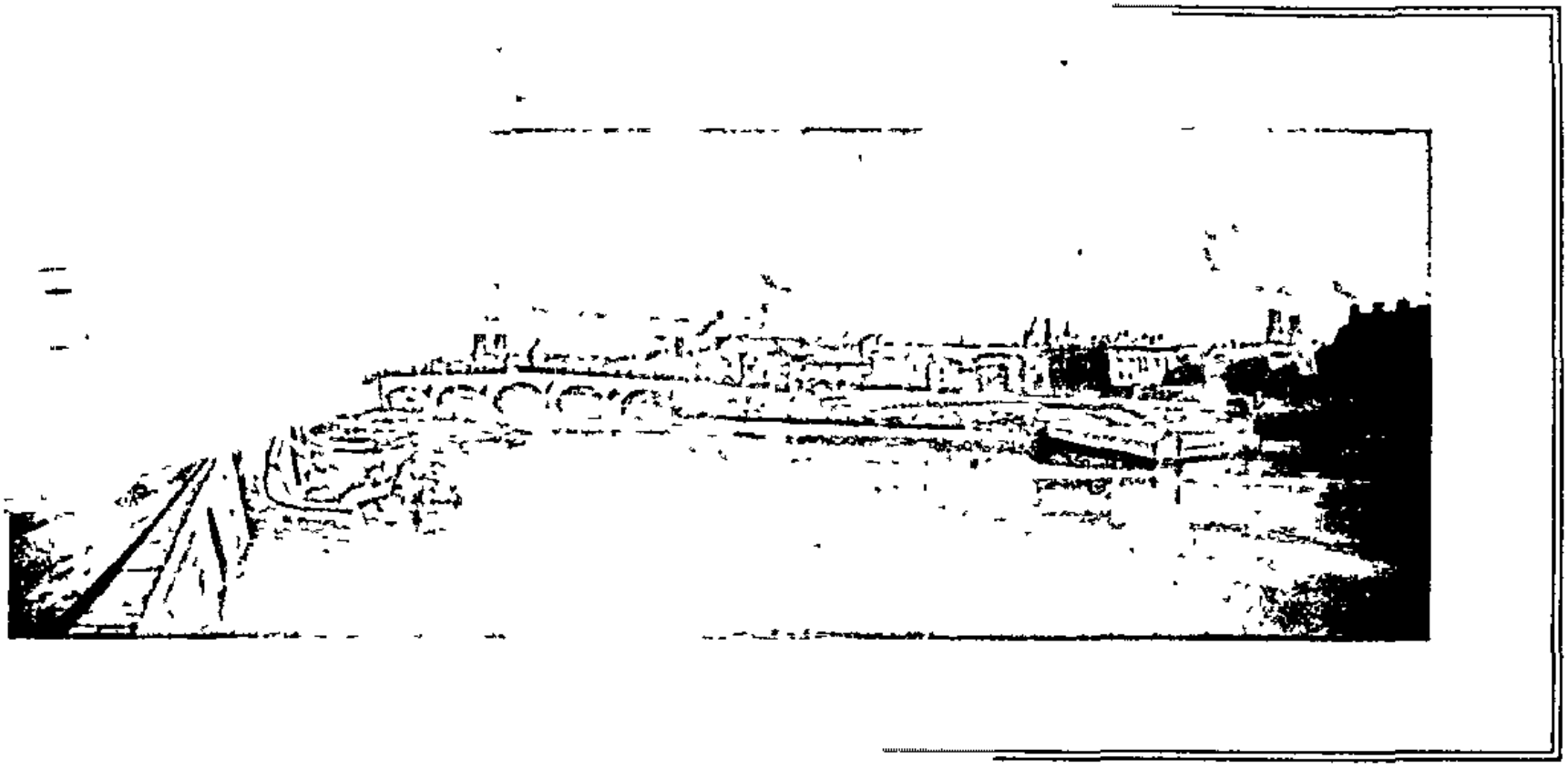
Block by
The Acme Tone Engraving Co, Ltd.



SEA GULL.

Note s ze of gull in small view taken with ordinary lens of 10½ inch e quivalent focus Gull alone taken with C. P. Goerz Tele lens 15 ½ mes magnifi ation

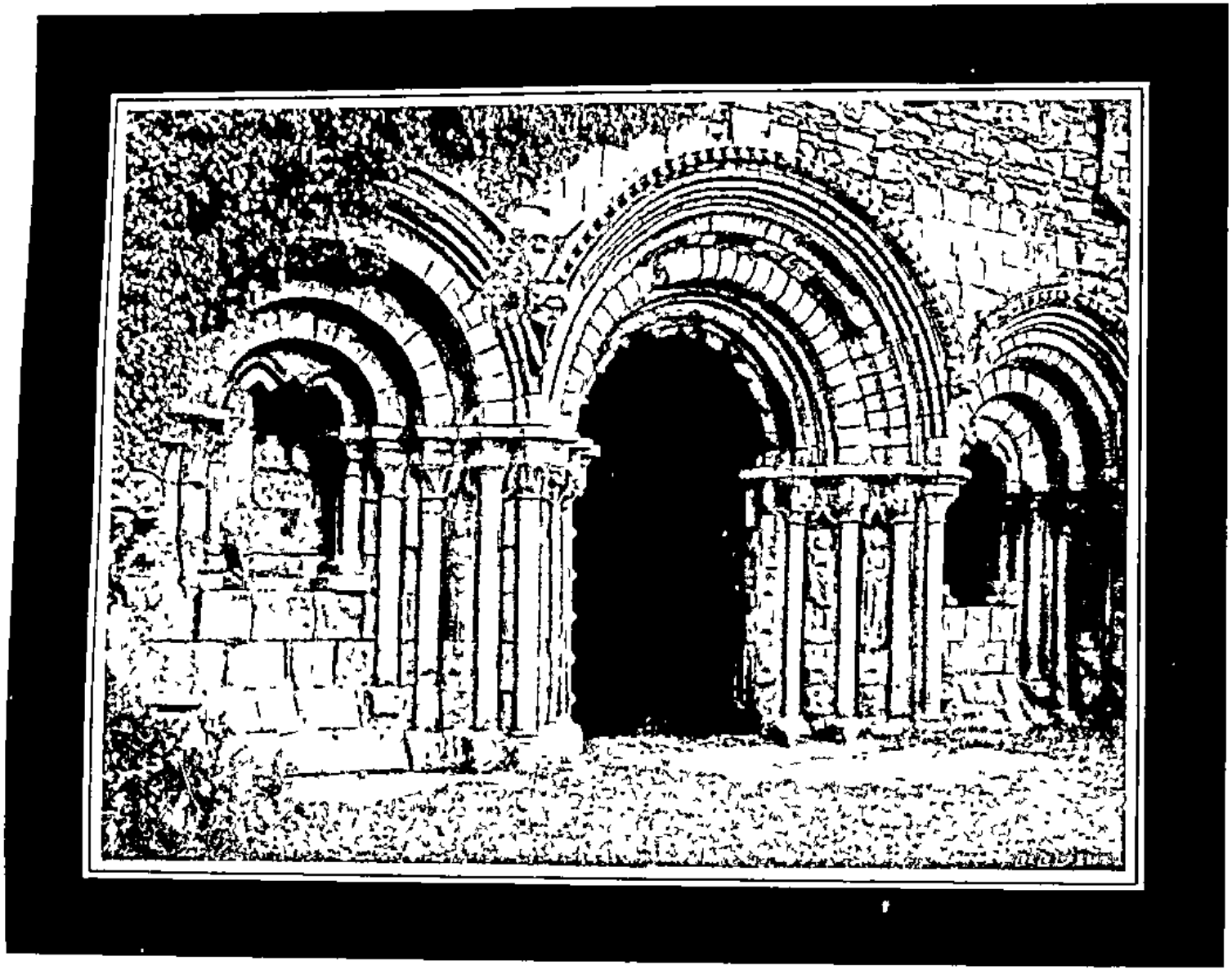




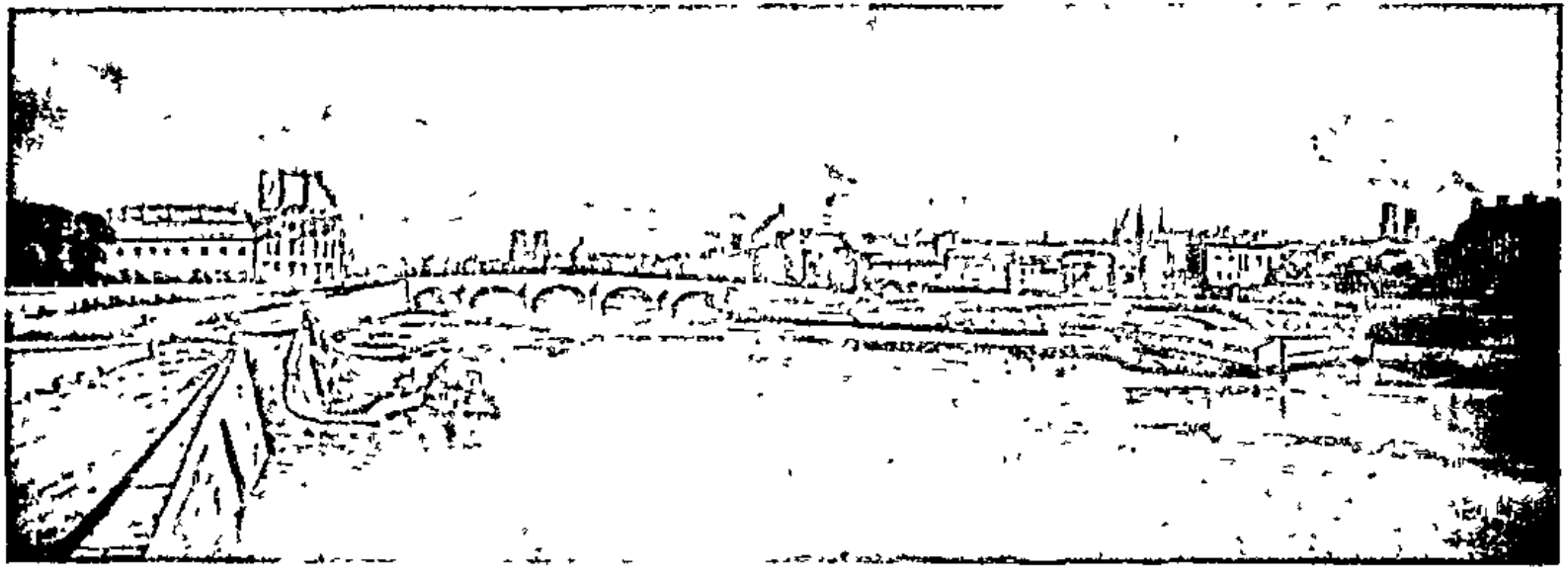
THE TUILLERIES, PARIS, in 1803.

Half Tone by
Chappelow & Co

From a Drawing by
Thos Girtin



HAUGHMOND ABBEY.



THE TUILLERIES, PARIS, in 1803.

Half Tone by
Chapmelow & Co

From a Drawing by
Thos Girtin



AT THE QUERN.

Grinding Corn in the Orkney Islands.

Line Zinc Etching by
Blatchford Bros.

Pen and Ink Drawing by
Thos Kent

which bear depicted on them in glowing colours symbolical animals or edifices which denote the semi-sacred uses to which this special fabric is applied, and which become known to the faithful adherents by this configuration. These coloured designs were originally executed by hand on the fabrics, chiefly by English litho artists, but subsequently some few years ago, at an eminent Yorkshire litho establishment, we were entrusted with the first attempt to print these designs on the fabric direct from stone, and on the largest size of litho machine (60″×40″). The venture fortunately proved a huge success, and since then many tens of thousands of pieces of textile fabric have been printed in colours from litho machines at this one establishment alone. Ah! but some may say, "this implies working for stock, we only work to order." True, that may be so, but remember all trades have at some time in their career to embrace the former system in conjunction with and auxiliary to, the latter.

Now for a few words as to the technique of this work. Not only can white textile fabrics be employed, but coloured fabrics as well, provided they are not too excessively coarse in texture For black and darkly-hued fabrics it is necessary to first print on them a white or light-coloured ground , this is done by printing a flake white solid on the parts where the printed colours have to fall, the outer edge of which should extend for about an eighth of an inch margin beyond the size of the design This primary printing may be done from a solid wood or metal block, cut or shaped to size required, or from litho stone. For this background, also, a metallic hued ground may be employed, by using silver bronze or aluminium metal leaf, and the subsequent printing in colours done on the surface of this. If, further, the job permits of a graduated tint background being utilized on part of the design over the metallic ground, then an exceedingly pleasing effect can be thus secured. One of the chief difficulties encountered in printing on woven fabrics is the sieve-like surface resulting from the warp and woof; this, however, may be minimized when printing the field or ground for the coloured textiles, if in the compounding of the ink, one-fourth of its bulk is made up of yellow beeswax, well ground into a pliant paste, by means of middle litho varnish; this enables the ink to size the pinholes of the fabric, and thus produce a more even planographic surface, which permits of the printing of process work or lithography with creditable effect.

The inks require a slightly modified treatment, than when printing on paper, as a somewhat larger percentage of body colour is demanded of them, and the inks must all be made to dry on firm by using a slow drier, until the final colour is being printed, when a rapid and more powerful oxidizer should be used.

In printing on white fabric from photogravure plate, if the fabric is feebly damped in a litho damp book, it enables a better print to be obtained. But if very limp fabrics have to be printed from Wharfedale or litho machines, they should be mounted by the edges on stiff paper or thin cards, and the gripper or laying edges trimmed in the guillotine, so as to ensure good register. Or for wood or metal surfaces the decalcomanie method could be used as an alternative.

In conclusion then, we are confident that all interested in the welfare of these reproductive crafts will welcome any legitimate move forward that will enhance their usefulness and widen the scope of their versatility into more extended spheres of commerce, thus rendering increased beneficial service to the community, and likewise tending to the more exalted ennoblement of art and learning. Thus may their beacon light still illumine the darkness of the night, and their hopeful watchword in the future strive as ever, "Onward and Upward" to attain the coveted goal of the ideal.



TWO ROSES.

Half Tone by
E Hamel & Co

Photograph by
H. Freckleton & Co



WALLAGE AND GILBETT
PROCESS ENGRAVERS
BIRMINGHAM.

Design by
HENRY G. WALKER
65 Bowyer Road
Bartley Green BIRMINGHAM

Photographed by
H Roland White, Birmingham



"IN THE GOOD OLD DAYS."

Half Tone on 150 line screen
by the Electric City Engraving Co.
Buffalo, N.Y., U.S.A.



"GOOD NIGHT, DADDY!"

Half Tone by
W & G Baird Limited

Photograph by
H R Hembry



"LOOK PLEASANT, PLEASE!"

Half Tone by
W & G Baird, Limited.

Photograph by
H. R. Hembry



"MARY, QUEEN OF SCOTS."

Half Tone on 150 line screen
by the Electric City Engraving Co
Buffalo, N.Y., U S A



PORTRAIT STUDY.

Half Tone by
Bourne & Co.

Photograph by
Reinhold Thiele.



NORTH AMERICAN INDIAN WOMAN.

Half Tone by
Philipson Son & Skilleter

Photograph by
Stuart & Whinfield.

STEEL FACING OF ENGRAVED COPPER PLATES.

By MAJOR-GENERAL J. WATERHOUSE, I.A.



CASTLE COOMBS, FROM THE CROSS.

Half Tone by BRITISH PHOTO-ENGRAVING CO

Photograph by H. C. LEAT.

IT is now some years since the process of acierage or steel-facing of engraved copper plates was introduced into this country from France by M. Joubert, the well-known engraver. In a paper read by him in November, 1858, at the Society of Arts, he says it was patented in this country by M. Jacquin, but the merit of it was due to M. Henri Garnier, one of the early pioneers of photo-engraving who originated many of our modern methods.

Until this process was brought out comparatively few good copies of an engraved copper plate could be printed off. The plates soon showed signs of wear, and the only remedy in cases when many copies were required was to make electrotyped duplicates and print from them; but they again quickly became worn out.

It was found, however, that by giving the original or duplicate copper plates a very thin plating of iron by electro-deposition a hard skin was produced on them which greatly increased the number of perfect copies that could be pulled from the plates before the steel-facing showed signs of wear, and as soon as it did so it could easily be removed and renewed as often as necessary, and in this way the life of an original engraved plate could be prolonged almost indefinitely.

For printing from heliogravure plates steel-facing is absolutely essential, otherwise the fine shallow grain would be ruined after a few pulls, and although the loss might not be so serious as in the case of a hand-engraved plate, the practical and economic value of heliogravure as a process would be greatly reduced.

The process itself is simple enough, but requires care and the knowledge of the best working conditions that comes by experience. It is much the same as when first introduced, and the changes are chiefly in the electrical power, dynamos or current from the mains replacing batteries. It is many years now since the writer had any practical experience in working it in India, but the following sketch of it may be useful to readers of the ANNUAL interested in the matter.

Preparation of the Iron Solution.—The depositing solution is an ammonio-ferrous-chloride, and is best formed by the action of a galvanic current on a solution of ammonium-chloride between two plates of charcoal iron, one of which is attached to the positive pole of the battery, forming the anode which dissolves in the

wiped with soft muslin and left on the heater till perfectly dry. It must then be well rubbed over with an oily rag. The plate being taken off the heater, laid face downwards on a table covered with clean paper, and the loops and connection band unsoldered, will be ready *for printing.*

Removing the Steel-facing.—A great advantage of this process is the ease with which the steel-facing can be removed when required. This is particularly useful with heliogravure plates which the writer found often did not stand more than about 1000 impressions before the grain became polished and gave flat impressions but by at once removing the steel-facing and renewing it the plates would give as good impressions as at first With a strong line engraving the wear is not so great To remove the iron the plate is first of all cleaned from all grease and printing ink with American potash, then washed over quickly with dilute nitric acid about 1 to 6 of water, rubbed and sluiced well with water. This will remove the steel facing in two minutes. Dry on the heater The writer preferred, however, to use dilute sulphuric acid, which cannot attack the copper and is *safer, though slower, especially for fine heliogravure work*

Throughout the operations great care must be taken to avoid any grit which may scratch the surface of the plates, and to obtain a perfectly clean, pure copper surface to the plates before deposition



FOTHERINGAY CASTLE MOUND
(Scene of the execution of Mary Queen of Scots).

Half Tone by
WALLACE & GILBERTT

Photograph by
THE CITY ART PHOTOGRAPHIC CO



A PORTRAIT STUDY.

Copper Engraving by
C. Angerer & Goschl, Vienna.

Photograph by
Dr. Szekely, Vienna.



Block by
The Tone Photo Engraving Co

Photo by
Beaufort



THE WEEPING MAGDALEN.

Half Tone by
Teachenor Bartberger Engraving Co
Kansas City, U S A.



MISS JENNIE BATEMAN.

Half Tone by
Dean Engraving Co

Photograph by
Alfred Ellis & Walery

THE CHRISTMAS PUDDING.





Blocks by
The Grout Engraving Co.

Reproduced by kind permission of
The proprietors of "The Woman at Home."



MISS JENNIE BATEMAN.

Half Tone by
Dean Engraving Co

Photograph by
Alfred Ellis & Walery

THE CHRISTMAS PUDDING





Blocks by
The Grout Engraving Co

Reproduced by kind permission of
The proprietors of "The Woman at Home.

example, if a drawing 12″ in length has to be reproduced 8″ in length, $x = \frac{8}{12} = \frac{2}{3}$. If the reproduction has to be 16″ in length, $x = \frac{16}{12} = 1\frac{1}{3}$. Then the equation which expresses the relationship between the two quantities y and x is,

$$y = \left(\frac{1 + x}{2}\right)^2$$

From this equation we can very easily get the value of y corresponding to any particular value of x. For example, if the exposure for same size is 70 secs and the exposure when reducing to $\frac{1}{6}$th size is required, other conditions remaining the same, then, since $x = \frac{1}{6}$, $y = \left(\frac{1 + \frac{1}{6}}{2}\right)^2 = \left(\frac{7}{12}\right)^2 = \frac{49}{144} = \frac{1}{3}$ approx

Thus the equivalent exposure is $\frac{1}{3}$ of 70 secs. or 23 secs If the negative was to be twice the size of the original, then $x = 2$ and $y = \left(\frac{1+2}{2}\right)^2 = \frac{9}{4}$ and the equivalent exposure is $\frac{9}{4}$ of 70 secs. = 2 mins. 37 secs

Some values of x and corresponding values of y are given below

Exposure Ratios.

Table I.—Principle Values in Vulgar Fractions.

Reduction or enlargement (x) ..	$\frac{1}{12}$	$\frac{1}{10}$	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{2}{5}$	$\frac{1}{2}$	$\frac{3}{5}$	$\frac{2}{4}$	$\frac{3}{4}$
Exposure ratio .. (y) ..	$\frac{7}{24}$	$\frac{9}{10}$	$\frac{5}{16}$	$\frac{1}{3}$	$\frac{9}{25}$	$\frac{5}{13}$	$\frac{4}{9}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{16}{25}$	$\frac{25}{46}$	$\frac{9}{4}$

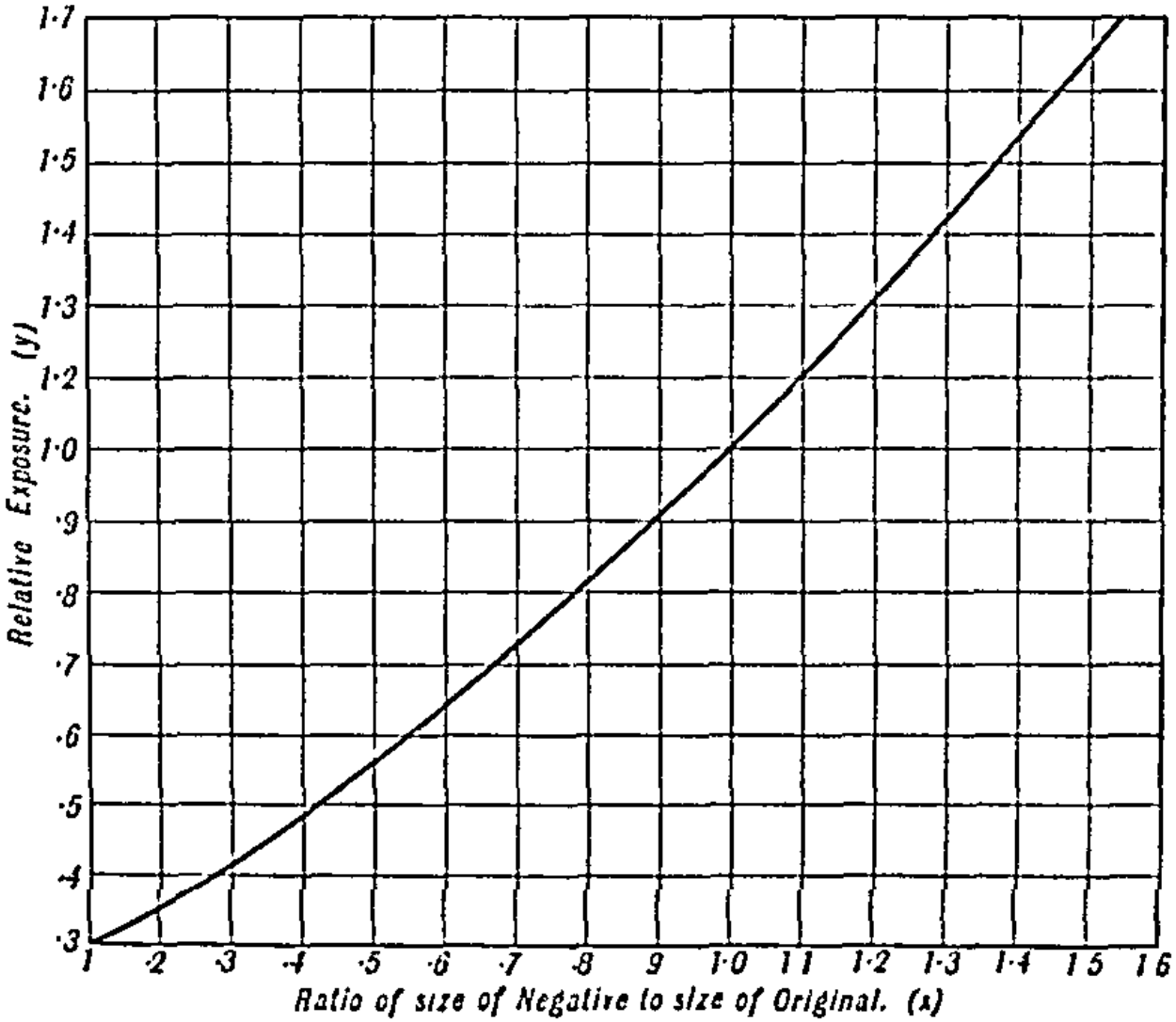
Reduction or enlargement (x) .	1	$1\frac{1}{4}$	$1\frac{1}{3}$	$1\frac{1}{2}$	$1\frac{2}{3}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	3	4	5
Exposure ratio .. (y) ..	1	$1\frac{1}{4}$	$1\frac{1}{3}$	$1\frac{9}{16}$	$1\frac{7}{16}$	$1\frac{7}{8}$	$2\frac{1}{4}$	3	4	$6\frac{1}{4}$	9

Table II.—Decimal Fractions.

x	·1	·16	·2	·25	·3	·35	·4	·45	·5	·55	·6	65
y	·30	·34	·36	·39	·42	·46	·49	·52	·56	·60	64	68

x	·7	·75	·8	·85	·9	1	1·1	1·2	1·3	1·4	1·5	1·6
y	·72	·77	81	·86	·9	1	1·1	1 21	1·32	1·44	1·56	1·69

Probably many operators will prefer to use a curve similar to the one from which the figure here is reproduced. It is constructed by plotting the values of x and corresponding values of y on squared paper, x horizontally and y vertically, as in this one, or *vice versâ*, if more convenient. Each square (which is one inch in length on the original) represents ·1 or $\frac{1}{10}$. Any one can obtain a sheet of squared paper and draw this curve for himself. As an example of how to use the curve, supposing the exposure for a reduction to $\frac{1}{10}$ size is required, *i.e.*, when $x = \cdot 3$. Move up the line $x = \cdot 3$ until you reach the curve, then move to the left horizontally and read the value of y on the vertical scale on the left.



It is ·42. Thus the required exposure is ·42 times the exposure for same size.

The working out of the formula explained above has been omitted, because, though of a simple character, it would only prove of interest to those who have some knowledge of geometrical optics.

The Strength of Illumination.

A source of light, the illuminating power of which is approximately constant, is, of course, essential for exactness in exposure. Good arc lamps fitted with the

best quality of carbons satisfy this need. The carbons are the important thing, for with inferior carbons the illuminating power may vary enormously.

The fact that the intensity of the illumination varies inversely as the square of the distance from the source of light, *i.e.*, at 30" is ¼ of that at 15", is too well-known to require explanation here. The labour of measuring the distances each time they require to be altered and making a tedious calculation, may be avoided by adopting a series of standard distances at which to place the lamps from the copy Three such series are given below.

Relative exposures required		1	2	4	8
Distances of lamps from copy in inches	Series I.	16	22½	32	45¼
	Series II	18	25½	36	51
	Series III.	20	28¼	40	56½

Suppose that for illuminating copy of small dimensions the lamps are used at a distance of 16 inches, then when copy too large to be evenly illuminated by the lights at that distance, was required to be photographed, the lamps would be moved to a distance of 22½ inches, thus doubling the exposure. For still larger copy the lamps would be placed at 32 inches distance, and the exposure would be twice as much as in the second case, and four times as much as in the first case.

The fact that the strength of the illumination at a point varies inversely as the square of the distance, necessitates the lamps being placed at sufficient distance from the copy in order that it may be evenly illuminated. If the distance of the arcs from the centre of the copy is twice its greatest dimension (not merely horizontally or vertically, but in any direction, *e g*, the diagonal in the case of a rectangle) then the ratio of the amount of light received by the point most remote from the centre, to that received by the centre, is as 16 is to 17. If the distance of the lamps were three times as much at the greatest dimension of the copy, the ratio of the amounts of light received would be as 36 is to 37, and the difference would be imperceptible. Therefore, it may be said that for half-tone work it is quite sufficient to place the lamps at a distance equal to three times the greatest dimension of the copy, and for line negatives say twice the greatest dimension, that is, supposing the arcs to be at the same height as the centre of the copy.

The Working Apertures of the Lens.

The amount of light gathered by the lens is proportional to the working aperture of the lens, *i e.*, the area of the diaphragm opening, and consequently the exposure is inversely proportional to the area of the diaphragm opening. The stops supplied with lenses being cut so that the relative exposures required by successive ones in the series are 1, 2, 4, 8, 16, etc., much calculation is not required here. Also the stops now supplied by Messrs. Penrose for half-tone work



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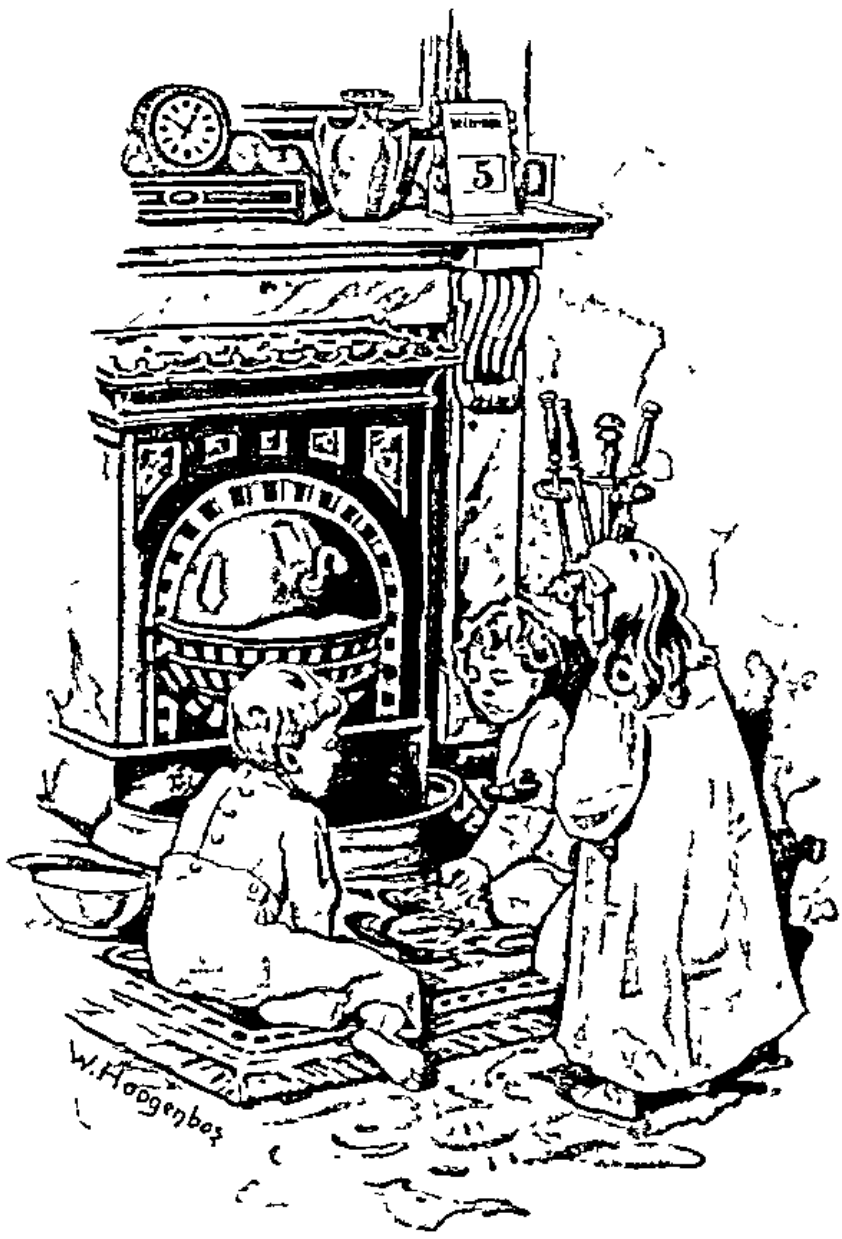
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Having now explained in detail what the writer believes to be the most simple way of calculating exposure, it must be insisted on that the success of its application depends on the development of the negative. Unless the time of development is the same in each case the results produced will not be in accordance with calculation. It should be easy to standardize the development, and in any case there is plenty of latitude, thanks to the powers of intensifiers and reducers. This, however, does not lessen the importance of giving the correct exposure and development.



BEDTIME

Half tone by
DE REPRODUCTIE CO., LTD.,
Rotterdam

WET-PLATE INTENSIFIERS.

By AN OLD HAND.

HAVING been behind the wet-plate camera for over thirty years, it has been the writer's lot to come across various intensifiers of one kind and another, published and unpublished. Where the general run of operators are deficient is in the proper intensification of a plate, as they are usually accustomed to one or two stereotyped formulæ, which frequently prove unsuitable to the work in hand, *viz.*, copper and silver, or lead and stinko being the general *ultima Thule.*

The following are all good reliable formulæ, some being permanent, while others, especially where intensified with mercury, cannot be depended on to keep more than two or three years.

COPPER AND SILVER.

Sulphate of copper	5 oz.
Bromide potass	4 „
Water	80 „

Bleach with bromide of copper; wash and blacken with 40 grains silver nitrate and 1 oz. of water, rendered acid with citric acid. This gives an intense black, and the operations may be repeated if not black enough.

MERCURY AND AMMONIA.

Bleach in 20 or 30 grain solution of bichloride of mercury to which a few drops of hydrochloric acid has been added and 5 or 10 grains chloride of ammonium to each ounce.

Wash and blacken with ammonia 1 in 10. This also gives a black tone.

MERCURY AND SODIUM SULPHITE.

Bleach as above. Wash and intensify with 1 in 10 solution sulphite of soda. A brown tone is the result.

MERCURY AND SCHLIPPE'S SALT.

Bleach with mercury and intensify after washing with 3 or 4 grain solution of Schlippe's salt. Colour is a non-actinic reddish brown and fairly permanent.

MERCURY AND "STINKO"

Bleach in mercury and wash. Intensify with hydrosulphuret of ammonium. Strong solution gives a brownish black image, and a weak one intense brown.

MERCURY AND SULPHIDE OF SODIUM.

Similar to above. Brownish tinge.

LEAD AND SULPHIDE OF SODIUM.

Lead nitrate	1 oz.
Distilled water	25 „

Immerse until negative is yellow right through; then wash, rinse with acid solution (½ oz. hydrochloric acid and 100 oz. water). Rinse again and blacken with three per cent. solution of sodium sulphide. Good for collodion emulsion.

LEAD AND "STINKO"

Lead nitrate	240 grains
Potassium ferricyanide	240 ,,
Glacial acetic acid	200 minims.
Water	20 oz.

Blacken with ammonium hydrosulphide, 4 oz.; water, 90 oz. Or better, sodium sulphide, 1 oz.; water, 20 oz.

COPPER AND IRON

Bleach with bromide of copper as per formulæ already given Wash and intensify with oxalate of iron Carry the intensification through. Crystals will form on the surface of the plate, but all wash off when finished. Yields beautiful olive green printing colour.

COPPER (CYANIDE) AND "STINKO."

Bleach with copper, and if slightly reduced (cut) with weak cyanide will take "stinko" and give good black image. Copper followed by "stinko" alone gives intense brown, but only a surface image which washes off and is of no use

BICHROMATE AND "STINKO."

Bleach in strong solution of bichromate of potassium Wash well and intensify with "stinko" 5 to 10 grains (or stronger). Works well for line negatives.

MERCURY AND CYANIDE OF SILVER.

Bleach in mercury. Wash well and blacken with cyanide of silver.

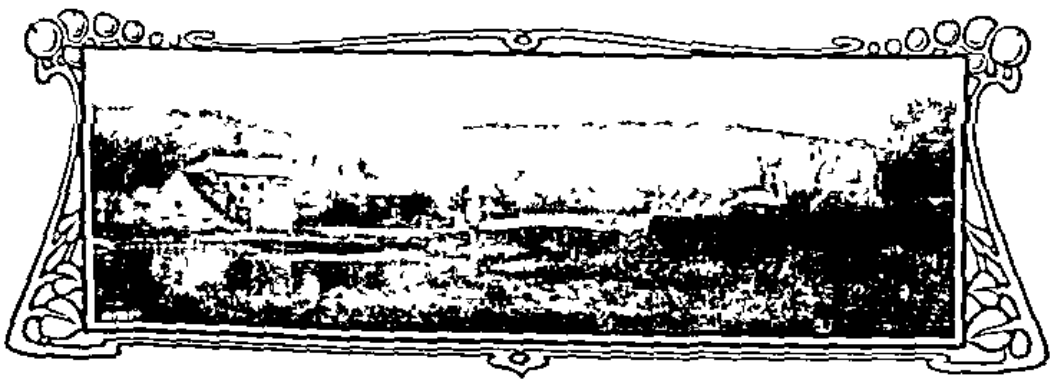
Pure Cyanide. A fairly strong solution, say 1 to 10, silver added to saturation gives black image.

GOLD INTENSIFIER.

Hypo	77 grains.
Water	16 oz.

Then make solution 7½ grains chloride gold in 16 ozs. water. When dissolved add little by little to hypo solution until all is mixed.

Bleach white with mercury and intensify with gold. I have not used this one.



STREATLEY MILL AND BRIDGE

Half Tone by
ARTHUR COX ILLUSTRATING CO LTD

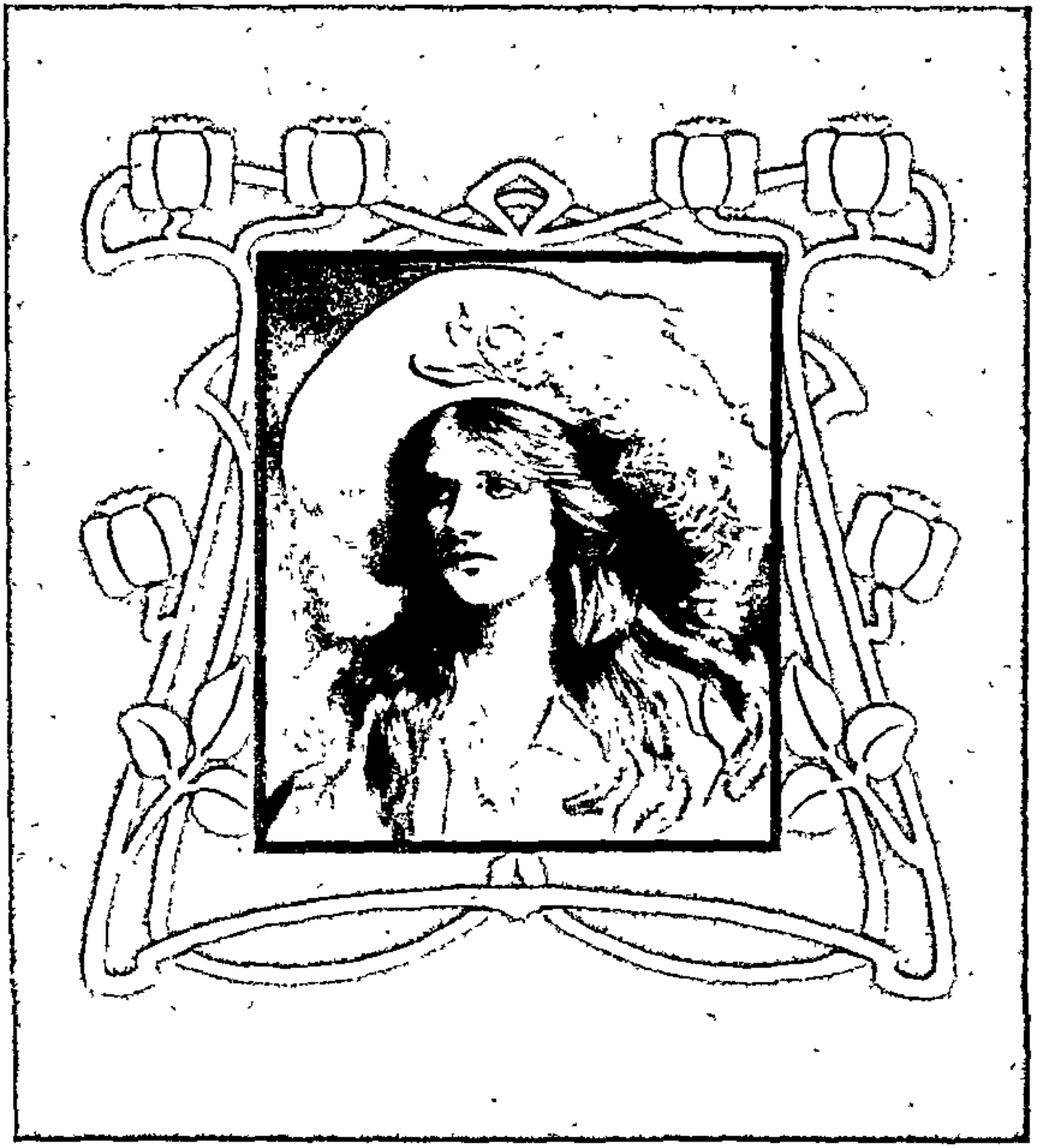
Photograph by
MARTIN J. RIDLEY.



H.R.H. THE PRINCE OF WALES.

Half-Tone by
The Grout Engraving Co

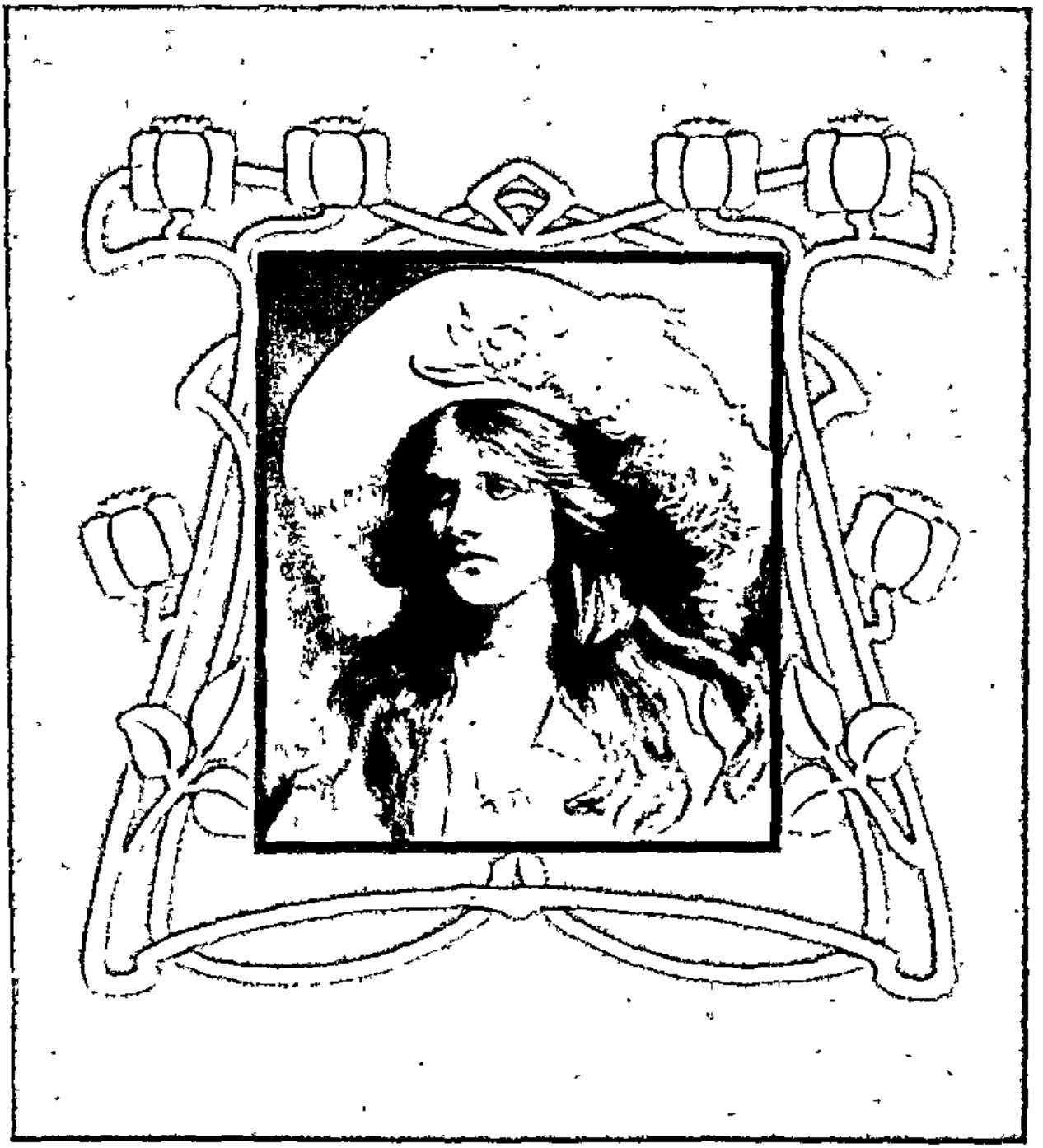
Photo by
J Russell & Sons



PORTRAIT STUDY.

Half Tone by
Photochrom Co. Ltd.

Photograph by
H. Coulton May



PORTRAIT STUDY.

Half Tone by
Photochrom Co., Ltd.

Photograph by
H. Goulton May



Block by
Hill & Co

Photograph by
Reinhold Thiele



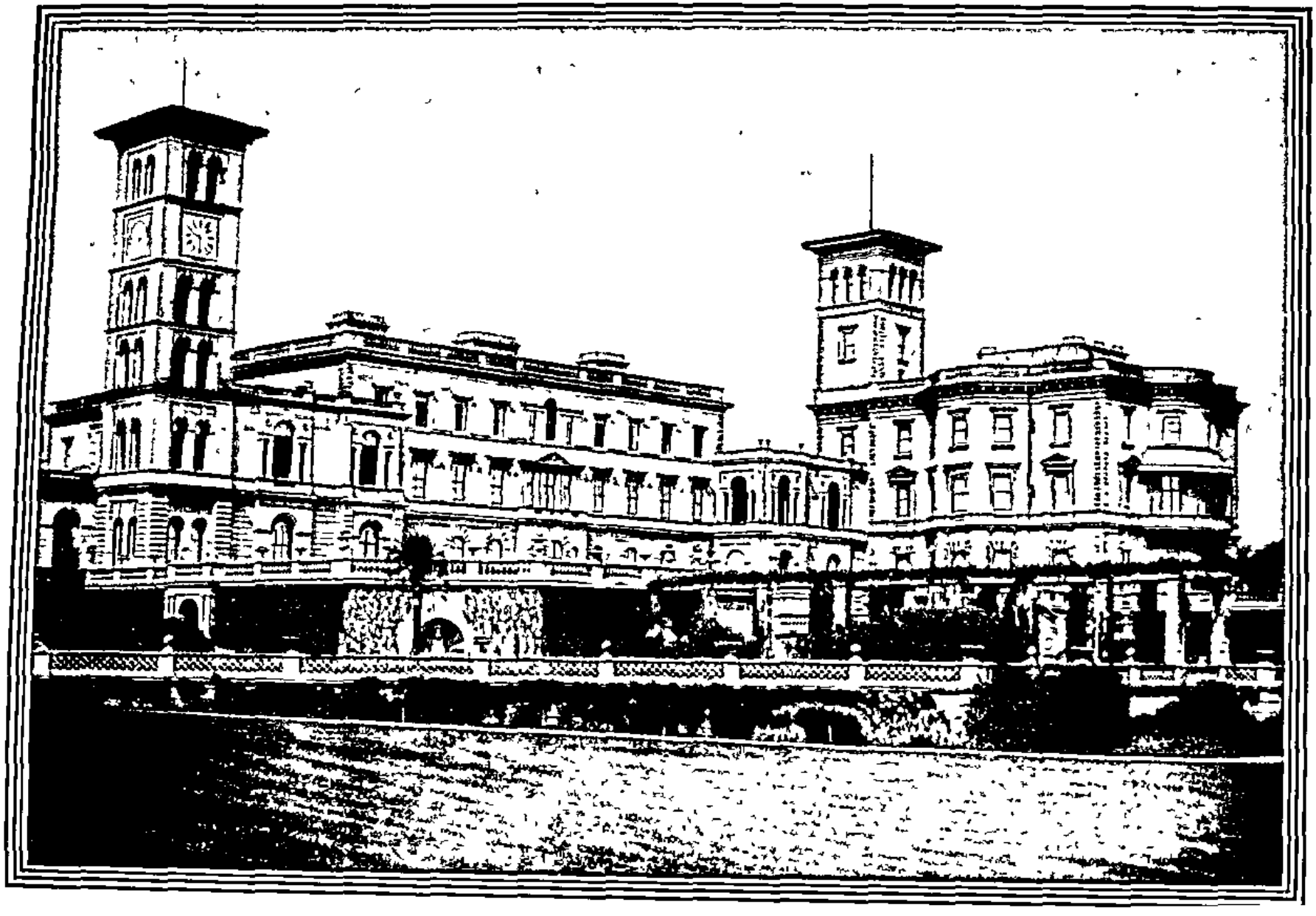
ARCHERY.

Half Tone by



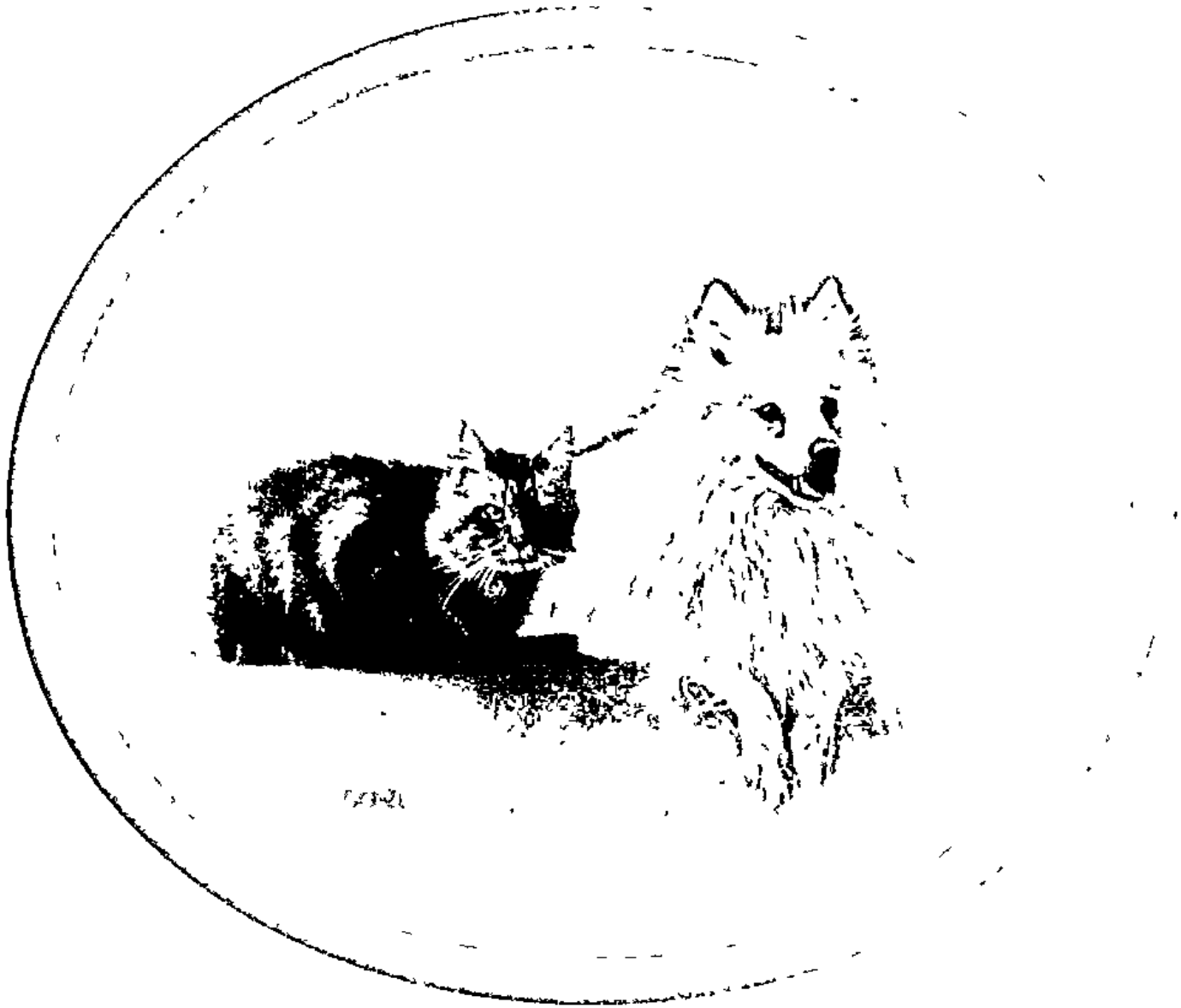
Block by
Hill & Co

Photograph by
Reinhold Thiele





THE DRAWING ROOM, OSBORNE.



GOOD FRIENDS



A STUDY.

Half Tone in Two Printings by
The Exemplar Engraving Co.

Photograph by
Langfier Ltd

PINATYPE.

By HERMANN SCHNAUSS.



BY MOUNTAIN AND FLOOD

Photograph by J. C. PHYTHIAN

PINATYPE is a new printing process for producing monochromatic and multi-coloured photographs, which has been invented by a Frenchman, Léon Didier, who transferred the rights for the industrial realization of the process to the Farbwerke vorm. Meister, Lucius & Bruning, of Hoechst, Germany. The new process is based upon the well-known property of gelatine to become insoluble when exposed to light in conjunction with bichromate of potash, but it is said that it differs materially from the older methods based upon the same principle.

Those acquainted with the Sanger-Shepherd process for producing coloured prints on paper, will find that the new process is not very dissimilar in its nature from the former method, the succession of the manipulations being, however, reversed in the case of Pinatype.

The process is as follows :—A glass plate, coated with a specially-prepared, very resistant gelatine film, is sensitized with potassium bichromate, dried and exposed beneath a *transparency*. The sensitiveness of the plate is about the same as that of printing-out paper. After the undecomposed bichromate has been washed out with *cold* water, an almost invisible image, consisting of hardened and soluble gelatine, will be left.

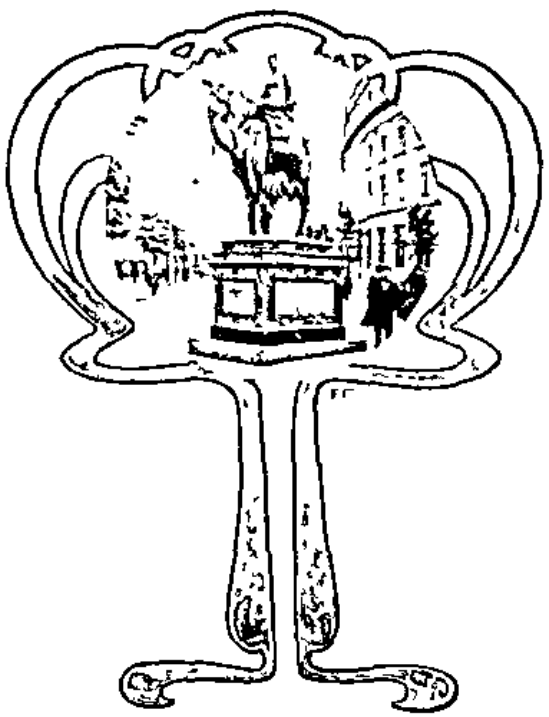
The plate is now placed in the aqueous solution of one of the several "Pinatype colouring matters," which may be bought from the Farbwerke of Hoechst. This colouring matter has the property of staining most the unexposed, *i.e.*, unaltered, gelatine, whilst it does not stain at all the entirely hardened parts of the gelatine film. The behaviour of the "Pinatype colouring matters" in relation to the gelatine image is, therefore, entirely the reverse in comparison with that of the dyes used by Mr. Sanger-Shepherd, Lumière and Dr. Selle, as only the soluble parts of the gelatine are stained by them.

After having been dyed for about 15 minutes, the plates are well rinsed with water, to remove the adhering stain. They should then show a clear, detailed and intense positive. In the case where the image is too harsh, *i.e.*, without detail in the lights, the plate has been over-exposed; if, however, the image is too soft and flat, *i.e.*, without clear and clean whites, then the gelatine has been insufficiently hardened in the high-lights, in other words, the plate has been under-exposed.

To transfer the image to paper, a piece of "Pinatype Paper" is soaked in water, until it has perfectly stretched itself, when it is squeegeed on to the stained plate by lightly going over it with the palm of the hand After the lapse of from 10 to 15 minutes, the image will have diffused into the paper, the latter showing, when stripped off, a vigorous print with clear whites, tender half-tones and of the most precise sharpness. This single-printing plate can be used for the production of any number of paper prints It is only necessary to place the plate previous to each new impression for about five minutes in the dyeing solution The printing plates may be dried and kept, so that they may be used at any time for the production of new impressions.

After having found out by experiments the time required for one definite plate, to obtain a good paper positive, it is very easy to produce a large number of absolutely uniform colour prints at very little cost and without any further co-operation of the light

The Pinatype process is equally well suited for the production of three-colour prints, and for this purpose it will prove to be specially valuable, inasmuch as it enables the operator to superimpose three really transparent colours without inserting any support for the images



GENERAL GORDON MONUMENT.

Half Tone by
[illegible].

Photograph by
ALF. J THOMSON

THE NEW SENSITIZERS AS APPLIED TO COLLODION EMULSION.

By HENRY O. KLEIN.



A LAKE SCENE

Half Tone by WALLACE & GILBERT. Photograph by J. C. PHYTHIAN.

BEYOND recapitulating the merits of two or three of the new sensitizers which have been introduced during the past year or two, I cannot say much to the credit of the others, which I think may be safely shelved by the practical worker. I will review the new sensitizers in chronological order, and begin with Dr. Miethe's Ethyl Red, one of the Iso-cyanine dyes.

Ethyl Red has proved of great value in the preparation of panchromatic dry plates, but if used as a sensitizer for collodion emulsion, especially if applied to process work, is of no importance. The general sensitiveness of such plates is very low, and their colour sensitiveness quite insignificant. The same must be said of *Orthochrom T.* and *Pinachrom*, both iso-cyanine dyes. Collodion emulsion plates sensitized with either and used without a silver bath are practically useless for trichromatic work. They show the speed of a wet plate, and if used with colour filters would necessitate—for collodion emulsion, at any rate—quite impossible exposures.

Mono-bromo-fluorescinate of sodium, however, a dye proposed as a sensitizer by Dr. Eder, is a more promising compound. The general speed of emulsion plates is greatly increased, especially if used with a ½ per cent. silver bath, and its green sensitiveness is quite remarkable. Collodion emulsion sensitized with Mono-bromo-fluorescin works extremely clear, and is perfectly free from defects we usually meet with, when working with aniline silver compounds. The same applies to *Pinaverdol*, recommended by Baron von Hübl.

Pinaverdol plates are washed before exposure, and the emulsions sensitized with this dye are of good keeping qualities, not being influenced by variations of temperature. For continuous tone colour work, Pinaverdol will be found to be the best sensitizer up to the present, especially on account of the keeping qualities and the extremely clear working properties it confers upon collodion emulsion. For half-tone three-colour work, however, I have found that Pinaverdol is not to be recommended. Although warmly advocated by several authorities, I find that the emulsions are not fast enough, especially in view of the fact that the absorption bands of the light filters have to be wider than for eosine-silver sensitized emulsions and, further, the half-tone dot is of a very woolly character and requires very small stops and plenty of doctoring. These are very undesirable features of a sensitizer to be used for direct half-tone colour reproductions.

Ethyl Violet, introduced by Dr. Valenta, is the only sensitizer which has proved to be of the greatest importance to trichromatic process work. Collodion emulsions sensitized with it exhibit very high general sensitiveness and colour sensitiveness in the orange regions of the spectrum, which can only be approached by cyanine.

The objectionable qualities of cyanine sensitized collodion emulsions are known, and Ethyl Violet sensitized emulsions are absolutely free from them. plates are very clear working, the emulsions keep in almost any temperature the colour rendering, using a fairly light orange filter, leaves nothing to be de

The speed of the plates is much increased by washing before exposu immersing in a ½ per cent. silver bath, but even without the latter is always enough to permit of an exposure, well within the fixed limits of an emu plate, which is liable to dry during a long exposure.

Dr. Eder advises the addition of mono-bromo-fluorescinate of soc which increases the general sensitiveness, but also creates a slight s sensitiveness; which, however. necessitates an alteration of the absorption. Diazol yellow has also been recommended as a desirable additic Ethyl Violet sensitized collodion emulsion, and the effect seems to be some similar to that produced by mono-bromo-fluorescin.

Backing of the plates will, in many cases, be requisite, as halation is noticeable in collodion emulsion plates sensitized with Ethyl Violet than in e silver emulsions, some of which contain a high percentage of picric acid, w acts as an anti-halo specific.

To sum up, we are still looking forward to a panchromatic sensitize collodion emulsion, which combines general sensitiveness with good c rendering, gives a good half-tone dot and permits of comparatively l apertures in screen work.

Many theories have lately been put forward to explain the cause of an appa spreading of light in emulsion films, and halation or irradiation has made responsible for a defect so very marked in fine screen work. Some of t theories have suggested remedies which were of real practical value, as, for insta those which originated from the Vienna High School of Photography and Regent Street Polytechnic, but no explanation was,to my knowledge, ever gi as to the strange differences in the action of different aniline dyes, and the that spirit-dissolved dyes, if used as sensitizers, gave considerably better half-t dots than in water-dissolved ones, and that washed emulsion plates give a m woolly dot than unwashed ones.

May it be that an alcoholic surface is not subject to the surely v disturbing evaporation of water, which must take place during a long exposu and which causes undulations between screen and sensitive plate, and wh we may reasonably hold responsible for the defect which is known un the name of a woolly dot ?

The most suitable sensitizers for collodion emulsion, as applied tri-chromatic work, are those which were used in making the negatives for t illustration of the "Fighting Temeraire" (facing this article).

This colour print, done in the evening classes of the Regent Stre Polytechnic, which classes I was called upon to conduct, has been made fr direct 3-colour half-tone negatives with collodion emulsion, for the production which the following sensitizers were used:

Canary II for the yellow printer.
Eoside of silver for the red printer.
Ethyl purple, 6B, for the blue printer.

The total exposures amounted to 16 minutes, flame carbons, burning at hig voltage in Westminster enclosed arc lamps, being used. If we consider that t working apertures did not exceed F/96 we may assume that the "ne sensitizers" are "out of the running" up to the present, whenever applied t colour work with collodion emulsion.



CUPID'S SPELL.

Three Colour Blocks by
The Photochrom Co , Ltd

From a Painting by H Woods
in Tate Gallery

THREE-COLOUR WORK WITHOUT FILTERS.

By PARRY WAGER.



THE BABES IN THE WOOD

Block by BERSILI & LADYMAN

Photograph by REINHOLD THIELE

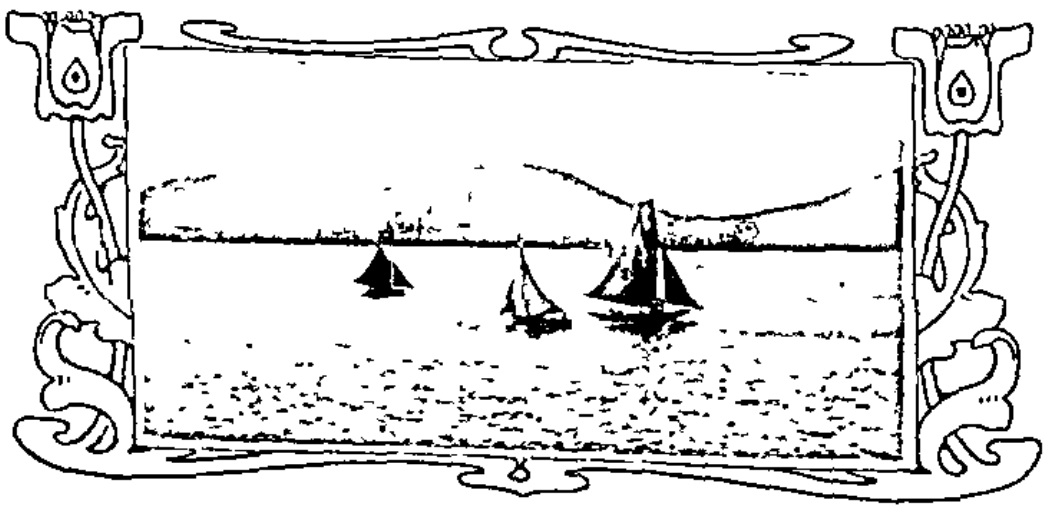
NOW that three-colour work is so well established, it may interest those engaged in it to point out that some originals which are usually regarded as totally unsuitable for the process are robbed of their difficulties if the ordinary method of making the *three* colour negatives is abandoned. As an example, suppose that one has to reproduce a large four-sheet poster; by the time it has been pasted up there will be a surprising amount of creases which will assert themselves to an extent that leads to several hours of unsatisfactory work for the engravers, or the raising of the ire of the ever-easily-irritated customer. Apart from this, however, is the question of lighting. Very few firms are able to effectually illuminate a *very* large copy, and fewer still have the opportunity of photographing it by daylight—if they had the daylight, which is at times an x quantity in the large towns. The usual way of dealing with such a subject is the indirect, as the quantity of light required is much less, and one has the advantage of touching up the original negatives and the positives before making the screen negative. A better way, however, is to make one negative on an orthochromatic plate with a yellow filter; then make a print on a glossy gaslight paper.

Suppose the original to have an orange background with black lettering on it, in the centre a dark blue-green tablet containing red letters. The orange ground will, of course, come as a decided tint, and as we shall want a strong tint of red to make orange, it is left as it is. The blue-green tablet—which has come out very dark—on the contrary, will require only a very light tint of red, a middle one of yellow and solid blue; so we paint a light grey tint of body colour over it, leaving the black outlines of the red lettering. This latter also requires a fairly light tint of yellow, so the same colour can be used on that if it has come out very strong. Next with a sharp knife, lightly scrape out all streaks and blemishes which are dark on a light ground. With care the tone of the surrounding colour can be matched. After this, with a fine sable and a little colour, any light streaks may be stippled out.

All that remains now is to make two negatives—rather flat—one at the normal angle, the other at 30° from the normal From one make two prints for the red and yellow plates, from the other one print for the blue. Before etching paint in on the yellow plate all the orange, as that colour requires a solid yellow. Then etch until we get the next tone, in this case the red letters on the green tablet ; then another etch to get the light yellow for the blue-green The red plate is, of course, carried through in the same way , the red letters put in solid. plate etched for the orange Then etched again to get the very large tint of red which will be found in most greens.

By this time the treatment of the blue plate is obvious All three plates being etched and proofed any re-etching is, of course, carried out in the usual manner, and a final proof taken Any out-of-the-way work may be tackled by this method with a considerable saving of time and a great improvement in the result. Take, for instance, such things as furniture, or cooking ranges Not only the size but the depth of colour is against good colour rendering but with a man with a good knowledge of colour to work up the prints, and give the first rough etching, a really fine result may be obtained

After the first proof has been pulled any three-colour fine etcher should be competent to carry it through. These suggestions are based on what has actually been done by the writer and under his supervision, and are offered as a practical way out of what sometimes proves an insuperable difficulty to small firms. The only essential to success is the abandonment of the idea that three-colour work cannot be done without three separate-colour negatives.



An Evening Sail

Half Tone by
Photograph by

VARIATION OF EXPOSURE DUE TO VARIATION OF SIZE IN COPYING.

By J. A. C. Branfill.



"Sea Breezes"

Design and Half-Tone by
W. G. Baird, Limited.

CONSIDERING the above, at first sight this would seem to vary as the square of the camera extension, which is often stated to be the case, but as we open the camera to obtain a larger image we move the lens nearer the object to be copied, and collect a larger portion of the bundle of rays reflected from each point in the original (of course assuming that the same stop is used in both cases), and *vice versa* as we shorten the camera for less enlargement, or reduction, we lengthen the corresponding conjugate focus, and thereby collect less light from each point than before.

The table shows the comparative exposures required as due to variation in size in copying. The column on the left contains the various amounts of reduction or enlargement from $\frac{1}{8}$ to 8 times same size. The row of figures starting from "same size" horizontally are the estimated values of exposure for that size, including from 1 to 30 units of exposure (say minutes or seconds); the other rows contain the comparative exposures for the different scales of copy with which they are in line horizontally. If we estimate that the proper exposure for a drawing same size is 15 minutes and we have to reduce it to $\frac{1}{4}$ scale, the comparative exposure will be 6 minutes nearly (see column 15). And if we want to enlarge it to 4 diameters the exposure with same stop will be 94 minutes. But suppose we think that 12 minutes will be more correct for same size, we must take the same row of figures in columns 2 and 10, which for reduction as above will be ·8 and 3·9=4·7 minutes, and for enlargements 12·5+62·5=75 minutes. Or if 7 minutes will have sufficed for same size, we find the comparative exposure in the columns for 2 and 5, *viz.*, ·8+2=2·8 and 12·5+31·25=43·75 respectively, which figures will be found in the horizontal rows corresponding with the respective ratios of enlargement or reduction. Of course, further alterations due to alteration of lens aperture must be made in the usual way.

N.B.—After working out the basis of these calculations I came across Mr. Debenham's table for a similar purpose in the *British Journal Almanac*, and have found it a useful check to my figures. I have, however, arranged the table.

as I think, more suitably than Mr. Debenham's for process operators, and beg therefore, to apologise for my apparent plagiarism

VARIATION OF EXPOSURE DUE TO VARIATION OF SIZE IN COPYING.

Amount of Reduction or Enlargement.	RELATIVE EXPOSURES.									
1/8	·32	63	95	1·26	1·582	3 164	4·75	6 328	7·91	9·49
1/7	·33	·65	·98	1·3	1·6	3·26	4 9	6·5	8·1	9 8
1/6	·34	·68	1·	1 36	1 7	3·4	5·1	6·8	8 5	10·2
1/5	·36	72	1 1	1 44	1 8	3 6	5 4	7 2	9	10·8
1/4	4	8	1 2	1·6	2·0	3 9	5·85	7 8	9 75	11·7
1/3	45	·9	1 3	1 78	2 22	4 44	6 6	8 9	11·1	13·3
1/2	·56	1 1	1·7	1 9	2·8	5 625	8 5	11 3	14 1	17
3/4	76	1 53	2 3	3 06	3 8	7·656	11·5	15 5	19 1	23
7/8	·88	1 76	2 7	3·5	4 4	8 82	13 2	17 6	22	26·5
Same size.	1	2	3	4	5	10	15	20	25	30
1 1/8	1 13	2·26	3·4	4 5	5 6	11 29	17	22·6	28·3	34
1 1/4	1·27	2·53	3 8	5·06	6·3	12 66	19	25·3	31·6	38
1 1/2	1·56	3·12	4·7	6·3	7·8	15·625	23·5	31·3	39·1	47
2	2·25	4·5	6 75	9	11·25	22·5	33·75	45	56·2	67·5
3	4	8	12	16	20	40	60	80	100	120
4	6·25	12·5	18·75	25	31·25	62 5	93·75	125	156·25	178·7
5	9	18	27	36	45	90	135	180	225	270
6	12·2	25·5	36·8	49	61·25	122·5	183·75	245	306	367·5
7	16	32	48	64	80	160	240	320	400	480
8	20 25	40·5	60 75	81	101·25	202·5	303·75	405	506 25	607·5



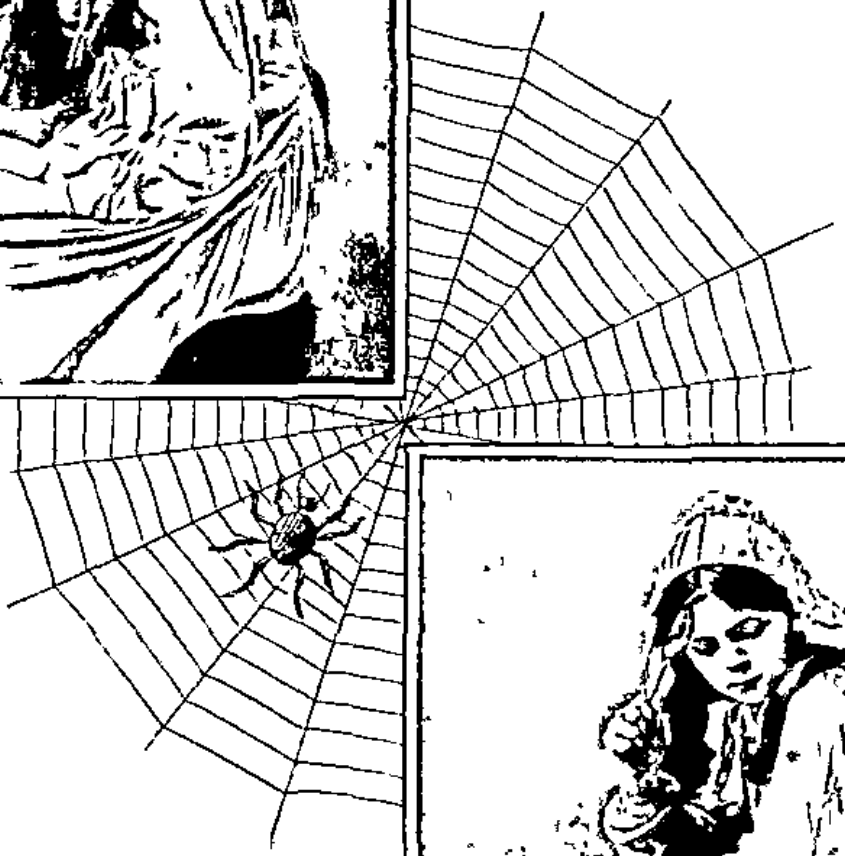
HAPPY BABY

Block by
ASHWORTH & MEREDITH

Photograph by
C. SWEET



'Little Miss Muffit,
Sat on a tuffet,
Eating curds and whey,'



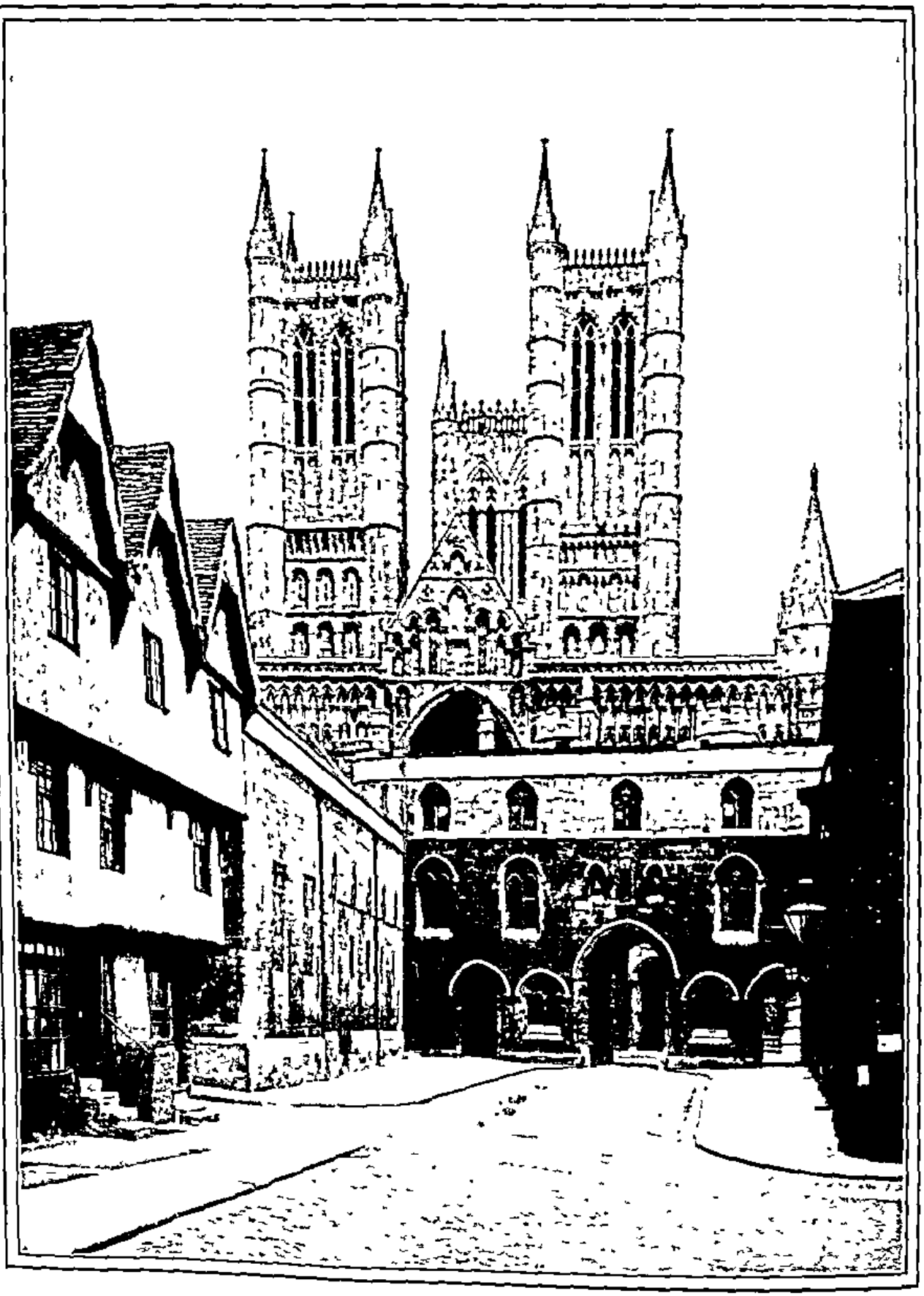
When down came a spider
And dropped down beside her



LITTLE MISS MUFFIT.

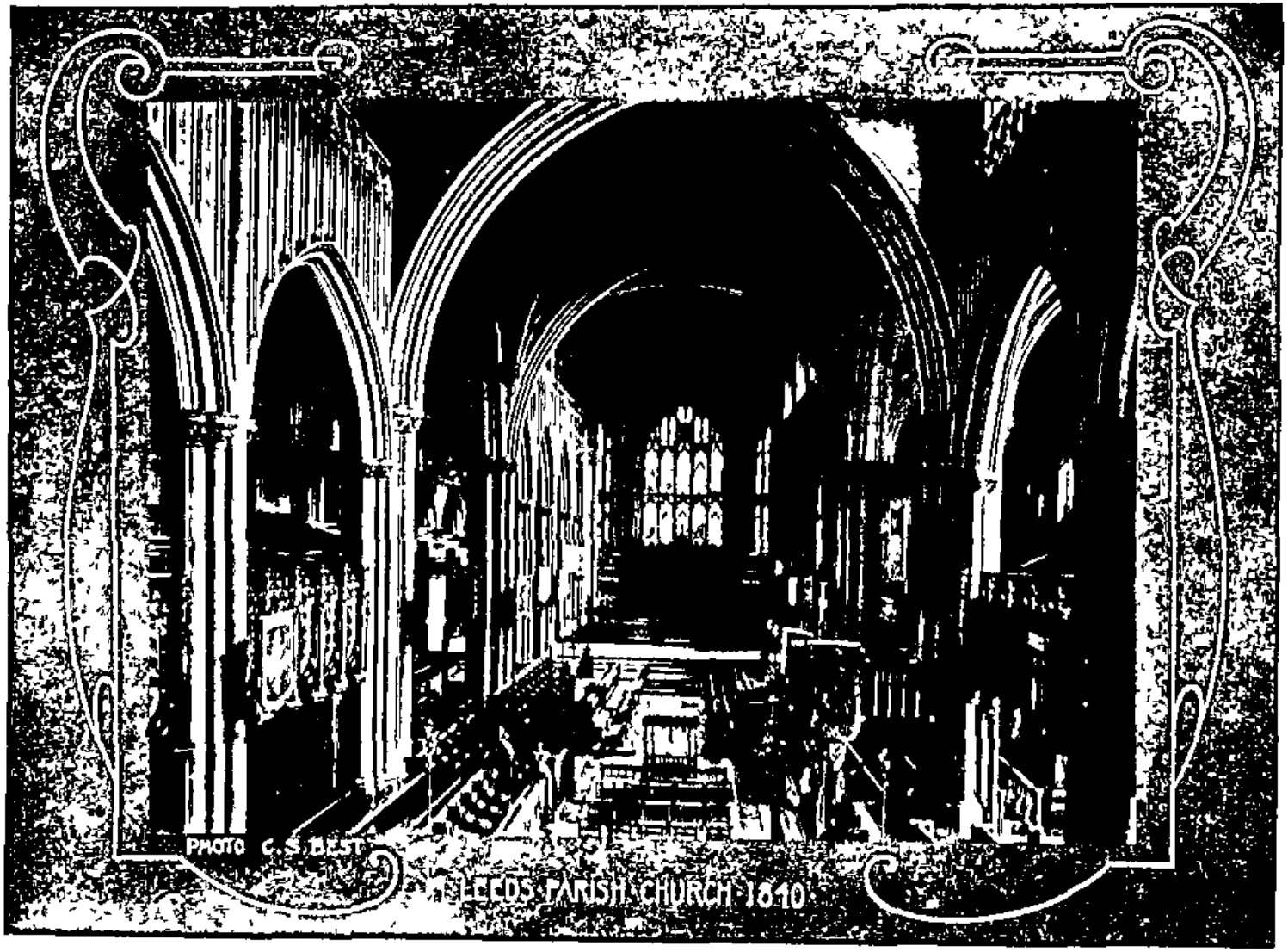
Half Tone by
Marshall Engraving Co

Photograph by
Reinhold Thiele



LINCOLN CATHEDRAL.

Half Tone by
The Acme Tone Engraving Co Ltd



Half Tone by
Gilchrist Bros



MISS ALICE DE WINTON.

Half Tone by
Bourne & Co.

Photograph by
Reinhold Thiele



PHŒNICIANS TRADING WITH THE
EARLY BRITONS

SOME NOTES ON THE SILVER BATH.

By ARTHUR PAYNE, F.C.S., F.R.P.S.



ALBAN'S CATHEDRAL RETRO-CHOIR

Tone by
& CRAMPTON

Photograph by
REV. T PERKINS

THE writer offers no apology for introducing such a commonplace and possibly irritating subject, for it is one the literature of which, though abundant in the past, appears to have been somewhat neglected in later years, and it has occurred to him that there must be many of the younger operators who may be glad of the opportunity of becoming acquainted with the gleanings of a fellow student.

In the first place it is well to remember, when you meet with trouble in the wet collodion process, that it is not always due to the silver bath being out of order. For instance, during warm weather the developer will work much more energetically than when it is cold, and therefore is more liable to produce "fog" upon the negative. The addition of a few drops of acid to the developer will usually remedy this defect, and when "fog" is obtained in warm weather, it is always advisable to try the effect of this remedy before condemning the silver bath.

The wet collodion plate also dries more rapidly in summer heat than during wintry weather, and trouble may be met with when lengthy exposures are made in the camera, due to the drying of the surface of the plate; many operators remedy this trouble by the addition of hygroscopic substances to the silver bath, but a better plan is to re-immerse the plate for one minute in the silver bath after exposure and before development. For this operation it is advisable, but not absolutely necessary, to use two silver baths, one of which is reserved for use after exposure only. By following this plan, the bulk of the ether and alcohol contained in the collodion film is retained in the first silver bath. This method of working may, with advantage, be employed all the year round, as it tends to the production of good clean negatives.

The silver bath ought always to be acidified when in use, as in this condition it produces a clean negative such as is not obtained if the bath be neutral, or alkaline. It is true that occasionally in the old days when collodion was used for portraiture, the operator worked with a neutral bath in order to obtain the maximum speed, but the conditions were accepted as being very trying and this method of working was only employed under compulsion. In process work, the slight extra sensitiveness so obtained is valueless and is outclassed by the clear negative obtained with an acid silver bath. Instead of using nitric acid, the writer recommends that the silver bath be acidified with acetic acid. The quantity to use depends upon the strength of the acid; it may be added

to the bath until it reddens blue litmus paper It is well to remember that an old time authority, named Jabez Hughes, states that a great excess of acid, especially nitric acid, in the silver bath, may produce "fog," but of this the writer cannot speak from experience.

When the silver bath becomes highly charged with alcohol. it ought to be placed with the residues, instead of attempting to rejuvenate it by expelling the alcohol by boiling the solution and then making the bath up to normal strength in the usual manner. The writer feels sure that this practice is not economical if the cost is calculated upon a business basis The silver-refiners charge one shilling per pound avoirdupois for reducing clean residue, paying for the whole of the silver recovered at the current market price, whilst the cost of boiling down the bath includes the value of the fuel and attendant's time and also the use of the necessary utensils, without reckoning the risk of loss by accident Neither is this procedure satisfactory from a photographic point of view because of the risk of thereby introducing organic matter into the bath

Finally, the writer wishes to remind all operators of the danger of the presence of organic matter in the silver bath, such as may be introduced by using a bad sample of distilled water obtained from steam, which has been condensed after having passed through a steam engine and therefore possibly containing oil or grease. The presence of deleterious vapours in the dark-room, such as a leakage of gas or the fumes from ammonia, ammonium sulphide, or from slow-drying paint are all causes which may prove fatal to the production of a good negative

These few notes do not profess to cover the whole subject, those faults that are likely to be known to all operators having been omitted and only the few included which are most likely, in the writer's opinion, to have escaped attention.



FRIEZE FROM THE TEMPLE OF APOLLO, PHIGALEIA, IN THE BRITISH MUSEUM

Block by
THE ART ENGRAVING CO., LTD.

Photograph by
THE CITY ART PHOTOGRAPHIC CO

NOTES ON THE OPTICAL PROPERTIES OF THREE-COLOUR PRINTING INKS.

By A. J. Bull.

L C C. School of Photo Engraving and Lithography



A Rocky Shore

Half-Tone by Carl Hentschel, Ltd

Photograph by J. C. Pythian

DEALING with three-colour inks from an optical point of view, a first essential is that the inks must be as transparent as possible. The light should not be reflected by the substance of the ink itself, but should pass through the ink and be reflected by the paper underneath. If this condition is not fulfilled in any ink then it will obscure the effects of the inks over which it is printed by scattering the light before it reaches them.

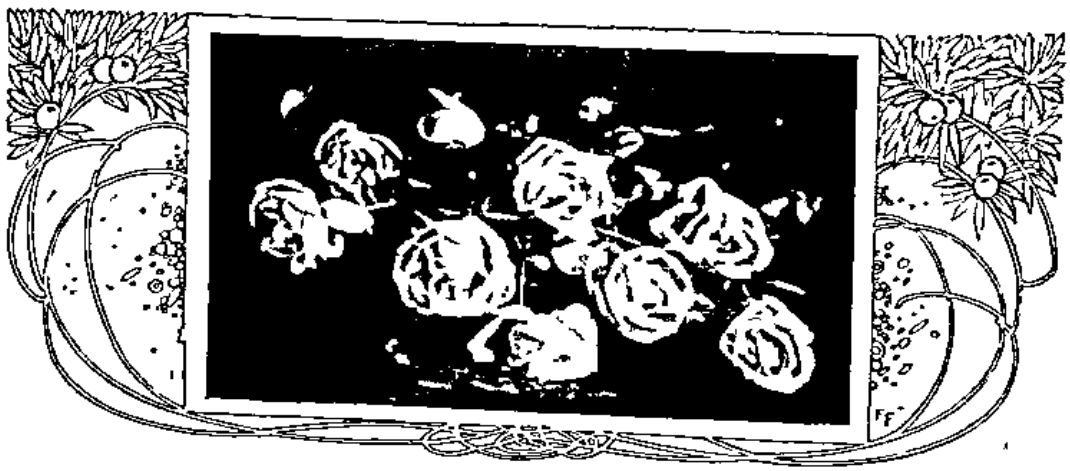
Regarding the nature of the light to which the individual inks should be transparent, it is necessary, quite apart from their relations to the negatives, that the inks by their suitable admixture must be capable of imitating all colours. Now, it is possible to imitate all colours by the addition of three coloured lights if these are the primaries, red, green and blue, and it follows from this that all colours can be matched by mixing three pigments if these each absorb one primary colour. This is putting the matter very roughly. Looking at it a little more closely, since the three inks printed on each other should give a black they must be so chosen that together they absorb all colours, and as when printed in pairs they should give the primaries red, green and blue-violet, any particular pair of them must absorb the pure colours of the spectrum yellow and blue-green which occur between the primaries. So that one of the inks should be transparent to the red, and the blue and violet, absorbing the yellow, green and blue-green, another ink must be transparent to the red and green, including as a matter of necessity with pigment colours of this class the spectrum yellow as well, and the third ink must be transparent to the green and blue and violet, and will incidentally be transparent to the blue-green as well, making a continuous band as in the second case. These colours will be respectively a crimson, a yellow and a blue-green.

Now the relation of a printing colour to the light photographically recorded in the negative is that, as well as being complementary, it should reflect all the light not so recorded. It has been shown that three-colour filters and plates when tested, should record the normal spectrum in even bands which overlap

in the yellow and blue-green regions, and the correct minus complementaries that should be used in printing from these are identical with the colours mentioned above as being those best suited to imitate all colours.

The inks that are employed in practice do not often approximate to these requirements. The most serious defects generally occur in the blue-green ink, there being a want of transparency to green light and an incomplete absorption of the red. In fact the ink is nearly always more blue than blue-green This results in the greens being darkened and the blacks and greys having a red tint The crimson, or, as it is usually called the red ink, is never as transparent to blue and violet as it is to red, the result of which is that instead of a blue-violet being obtained by printing this and the blue-green ink together the colour is more often an unpleasant purple. Another defect of the crimson ink is that it is often transparent to the spectrum yellow, so that when printed on the yellow ink the colour resulting is an orange-red rather than a full red There is no difficulty in obtaining yellow inks of the correct hue, but the only approximations to the correct colours for the other two inks are too fugitive for extensive practical use

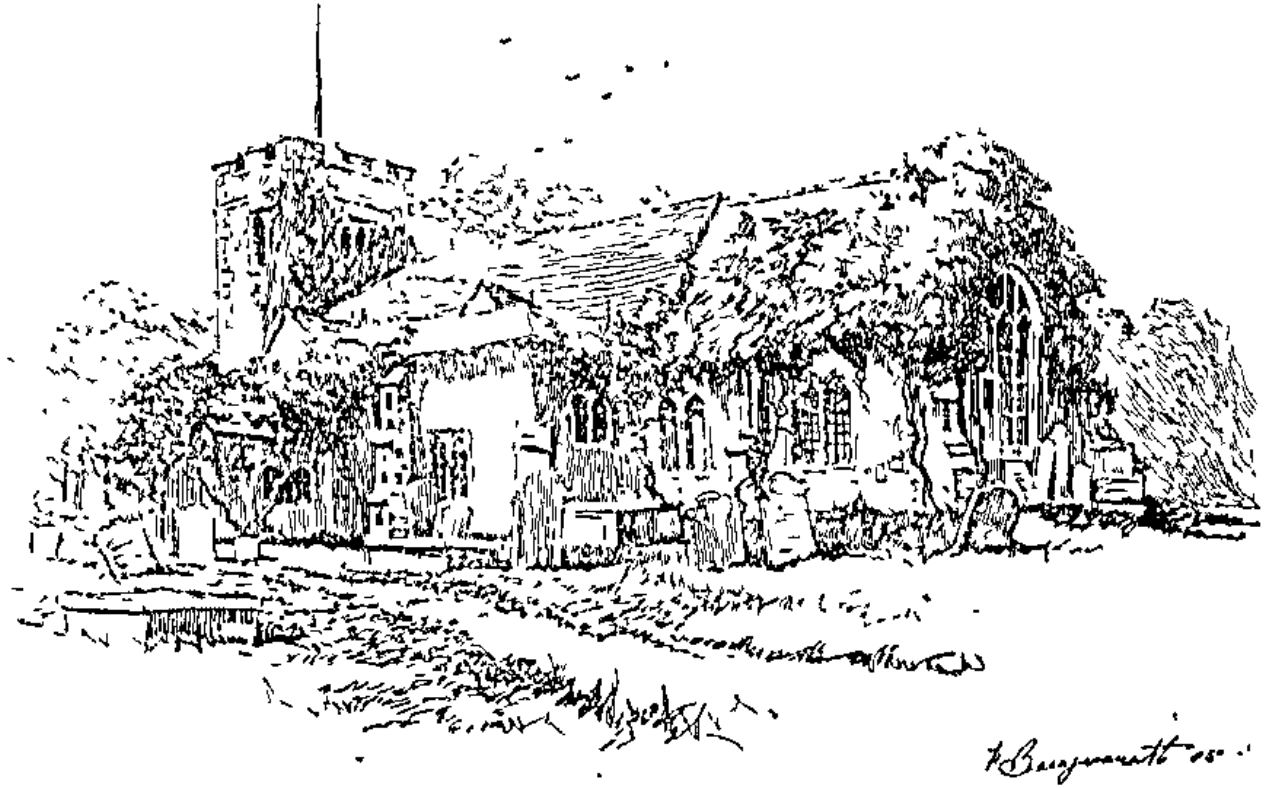
Doubtless ink manufacturers are making endeavours to obtain inks that not only reflect the correct colours but which are also transparent and permanent. Until this is achieved there must remain that amount of fine-etching which is due to the use of imperfect inks.



ROSES

Half Tone by
MARSHALL ENGRAVING CO

Photograph by
W. P. THOMSON



THE VILLAGE CHURCH.

Line Zinco with Tint Background by
Klobee & Franklin

DEVILS IN PHOTOGRAVURE.

By W. T. WILKINSON.

BAD or unsuitable copper, etc., is usually blamed for the appearance of these defects in a photogravure plate, but the metal has nothing to do with them: they are caused by air-bells imprisoned between the carbon negative and the grained metal. They are easily avoided. First of all the bitumen dust must be thoroughly melted, and before the carbon negative is mounted upon the plate, it should be immersed in cold water, and the surface brushed over with a soft brush, which will break up any air bells; after this is done, the carbon negative and grained plate are brought into contact, lifted out of the water and squeegeed. When the carbon negative splits away from the copper plate after it is dry, the uncovered metal was tarnished, which often happens, when the plate has been over-heated during melting the dust, or when the plate has been grained sometime previous to mounting the carbon image upon, or when the plate has not been thoroughly clean before placing in dusting box. The remedy for this, is to immerse the plate in a mixture of

Chromic acid	1 dram
Sulphuric acid	1 „
Water	40 ounces.

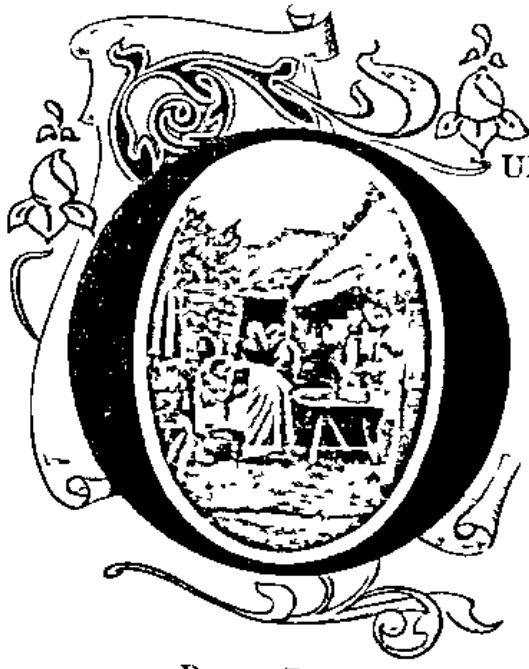
Brush over the surface with a soft brush, rinse under the tap, back and front, then place in dish with the carbon print



THE PALACE, BEAULIEU, HANTS

POST-CARD NEGATIVES.

By JOHN P. GLOVER.



DINNER TIME

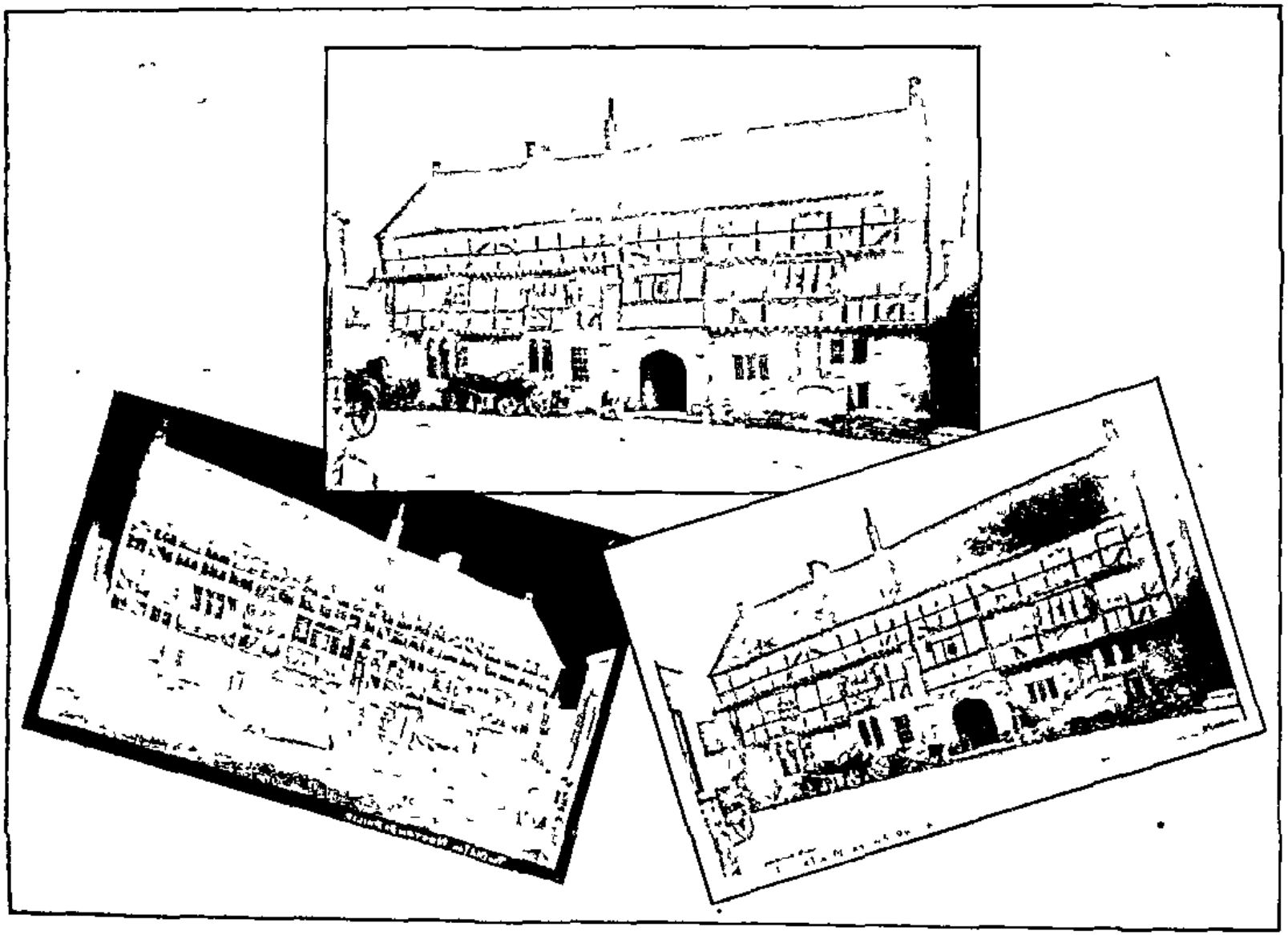
Design and Half Tone by
W. & G. BAIRD, LTD.

OUR Editor asked me long ago to write on methods of reversing negatives for use with the Sinop Collotype Process, and, true to the instincts of my obedient childhood, I set to work to investigate carefully all the methods practised, and one other of my own devising. But the grip of the Post-card seized me meanwhile, and after hitting on an easy means of producing the secondary reversed negative suitable for making commercial post-cards with the Sinop apparatus, I decided, wisely I think, to give a very useful process within my own experience rather than a confusing multiplicity of stripping and reversing methods.

I have found it very convenient in the many branches of photographic and process work one finds oneself grappling with constantly, to have at hand a good transparency of useful negatives, as in this case one can at short notice make new negatives, large or small, correct or reversed, at will. Thus I used several rather thin pyro-developed transparencies, reduced and masked to postcard size, to obtain reversed negatives for Sinop plates, and it will be sufficient to say that for this process it is only necessary to make the transparency and secondary negative by means of full exposure, as a thin detailed negative, without fog or stain, is what is desired.

Being asked for photo cards (*e.g.*, glazed P.O.P. post-cards) from the same views, I was confronted both by the impossibility of including the whole of a half-plate view on a post-card; the necessity of masking and titling; and, finally, by the impossible slowness of printing silver cards from an ordinary negative. All these difficulties are overcome by the following method, which suggested itself from the use of the masked transparency made for the Sinop reversed negatives. I now print one hundred P.O.P. post-cards from ten frames in one hour, in full sunlight; and ten frames are as many as can be manipulated, keeping the printer constantly in quick movement.

Our illustration, a subject of historical interest, shows a photograph of but indifferent technical merit, having been taken with a wide-angle lens in the face of the sun, on a half-plate. On the left appears a print from a reduced masked transparency, after titling. On the right is the finished post-card, printed in four minutes on Mauve P.O.P.



Negative Positive

THE OLDEST VILLAGE INN, NORTON ST PHILIP, NEAR BATH (DATING FROM 1395)

See article on "Post card Negatives," by J. P. Glover

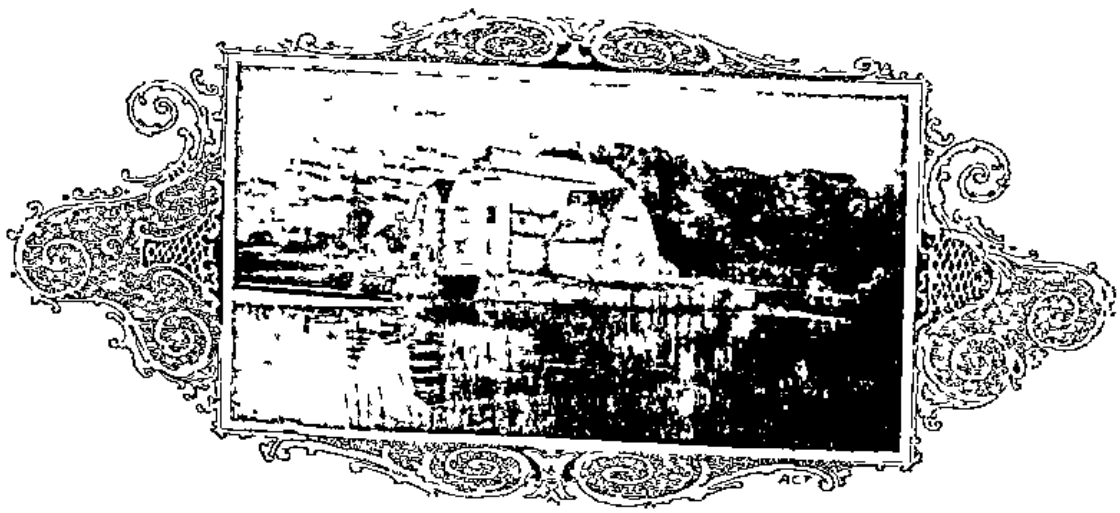
To our method. The original negative is placed in the enlarging camera, focussed when reduced to post-card size, and a half-plate laid down after closing the shutter. A mask cut out of black paper, any shape desired, is now laid over the plate, and the exposure made. I use daylight as the luminant, and give an exposure of four to eight seconds on an orthochromatic plate, with stop f/11, at five o'clock in the afternoon. It is essential to place a black paper backing behind the plate. Friend Pyro-Soda does the rest, until the rather thin image almost disappears in the darkness of over-development The resulting positive should appear very weak by transmitted daylight, but clear and defined when viewed against the white ceiling of the room.

When dry, the transparency is titled (not reversed lettering) with black process ink by means of a fine mapping pen Where the foreground is light enough, it is better to put the title on the picture.

It is now obvious that a correct or reversed negative may be obtained at will by changing the position of the transparency in the enlarging camera, and I need only say that by this means a reversed negative perfectly suitable for the Smop process may be obtained

For silver printing, the transparency is now reproduced exactly the same size, on an ordinary plate, giving about the same exposure under the same conditions as above. But the result will be observed to be by no means similar, for the negative will develop up more strongly, and first the masking will show *through* the plate, and then the high-lights will quickly appear. The development should be stopped while the shadows are still white emulsion on the film side of the plate, care being taken only that the shadow detail is slightly developed thereon. When fixed in an acid fixing bath, the negative will be of a ghostly thinness, and should appear black and clear against the ceiling.

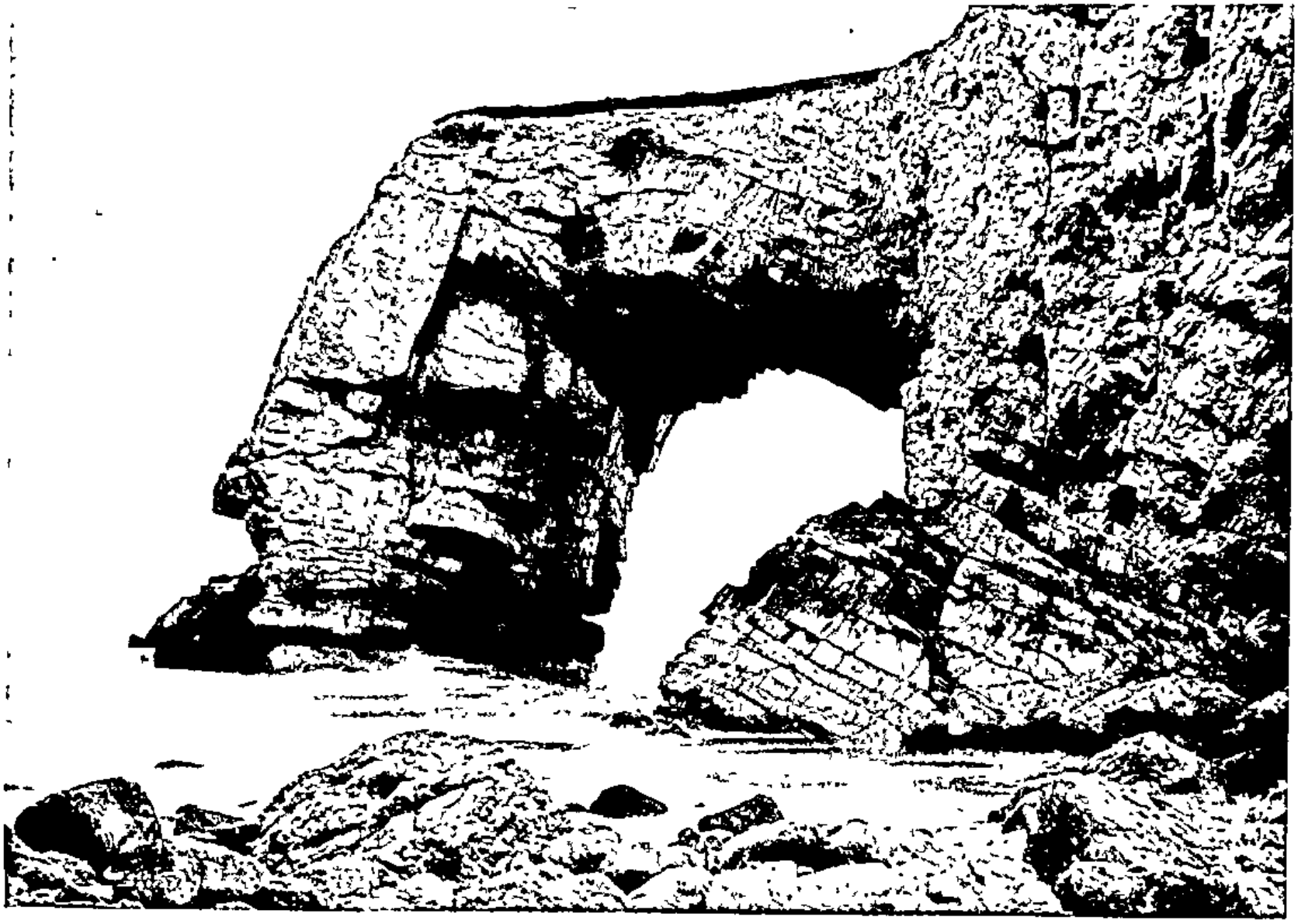
When dry, a post-card is carefully adjusted for the margins, and a pencil run round the card to give a guide mark for placing the post-cards. Through such a negative the print may be seen quickly to redden in full sunlight, and the finished post-card in our illustration will demonstrate that the gradations are correctly retained.



THE OLD WATER MILL

Design and Half Tone by
LASCELLES & Co., LTD.

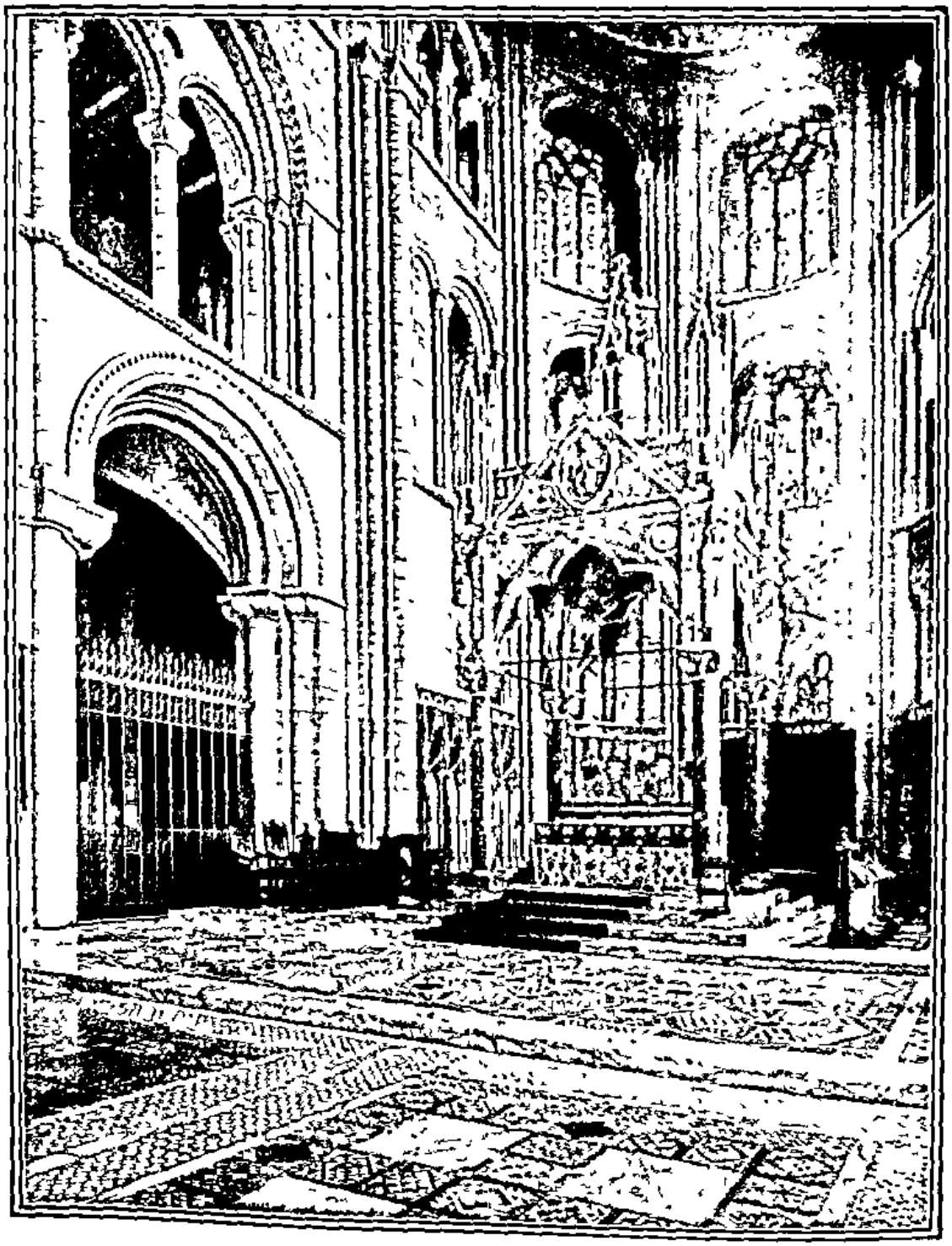
Photograph by
GODFREY BINGLEY.



THE GREAT ARCH, PORTSALON, CO. DONEGAL.

Half Tone by
W & G Baird Ltd

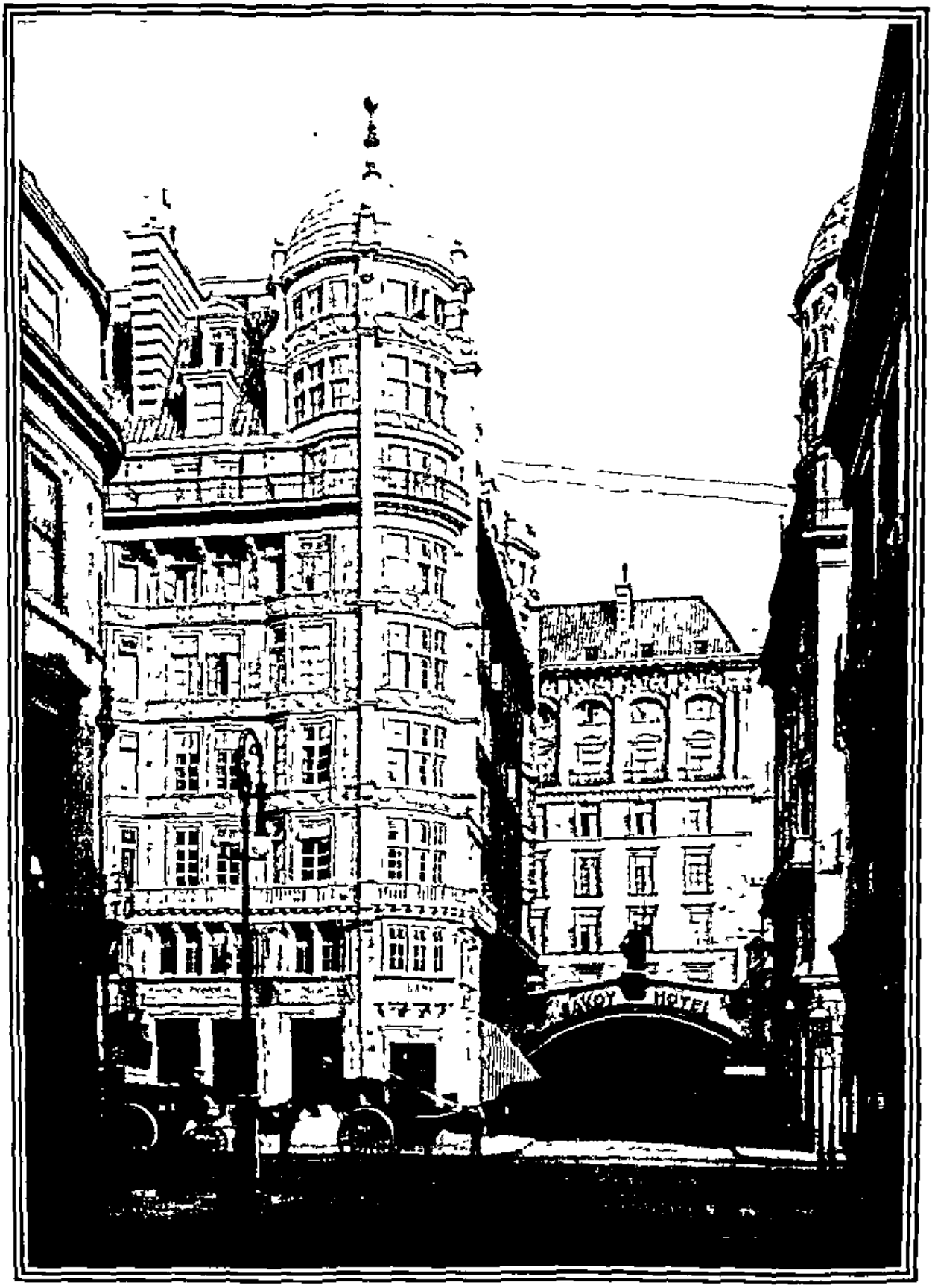
Photograph by
R. Welch



PETERBOROUGH CATHEDRAL.

Blocks by
The Grout Engraving Co

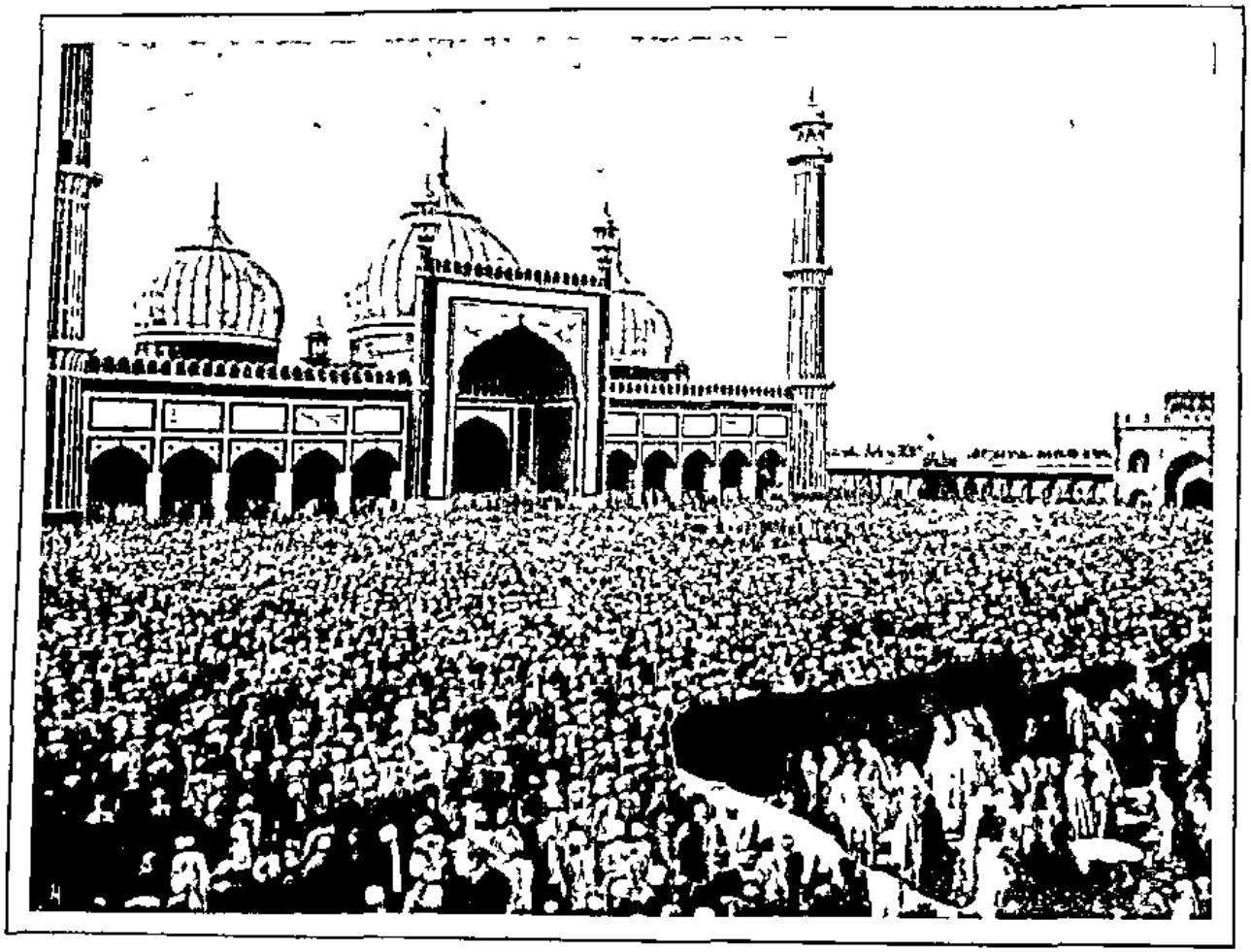
Taken with a Goerz Lens
Reproduced by permission



THE SAVOY HOTEL.

Half Tone by
S A. Cattell & Son.

Photograph by
J Lymbery.



SCENE AT THE JUMMA MUSJID, DELHI.

FESTIVAL OF THE MOHURRUM

Block by
H Hands



KATHERINE

in "Taming of the Shrew"

Blocks by
Collodion Emulsion
Direct Process.

By Students of
Tricolour Class
L.C.C. School
of Photo-Engraving
and Lithography

From a Water-Colour Drawing by CLAUDE A. SHEPPERSON *Esq*

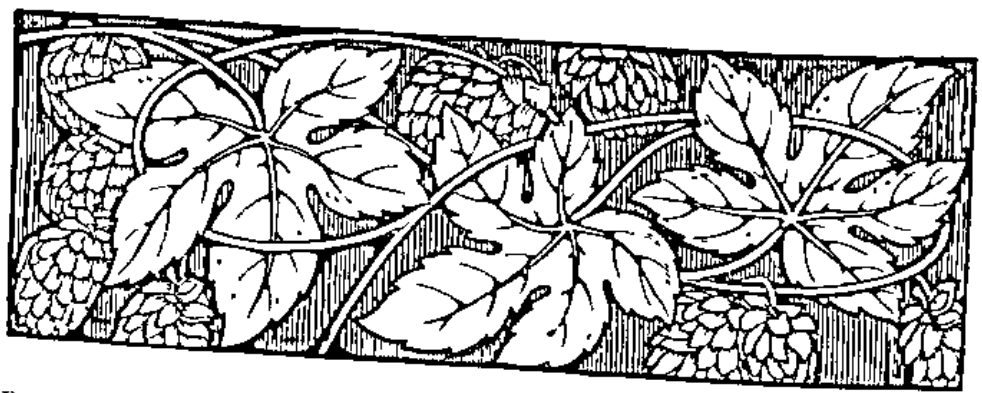
well, the wave lengths on top and the Fraunhofer lines below (fig. 2). Place the scale on an ordinary camera, and photograph it down to exactly the size of our image of the spectrum. From this negative we have to make a positive. The negative should be masked out, and a strip of thick paper laid at the side to adjust the plate on which we want to make our positive, and then five exposures made on a ¼-plate correctly moved as to position. then develop, fix, dry and varnish. Then place in the camera, again focus the arc, and move until the D line is exactly in the right place, when the plate is carefully cemented down in the dark slide.

Now when a photograph is made in the camera the scale is recorded on the negative, so that it is at once seen the character of the light that is being recorded, and conversely what light is being absorbed.

An example of the use of the spectrum camera is given in the illustration of a test on collodion emulsion to which has been added Messrs Meister Lucius and



Brunning's dye "Pinacyanol" This clearly shows that such emulsion is extremely sensitive to orange and red, but insensitive to blue-green.



Design and Block by
Students of the Bolt Court School



IN DIFFICULTIES.

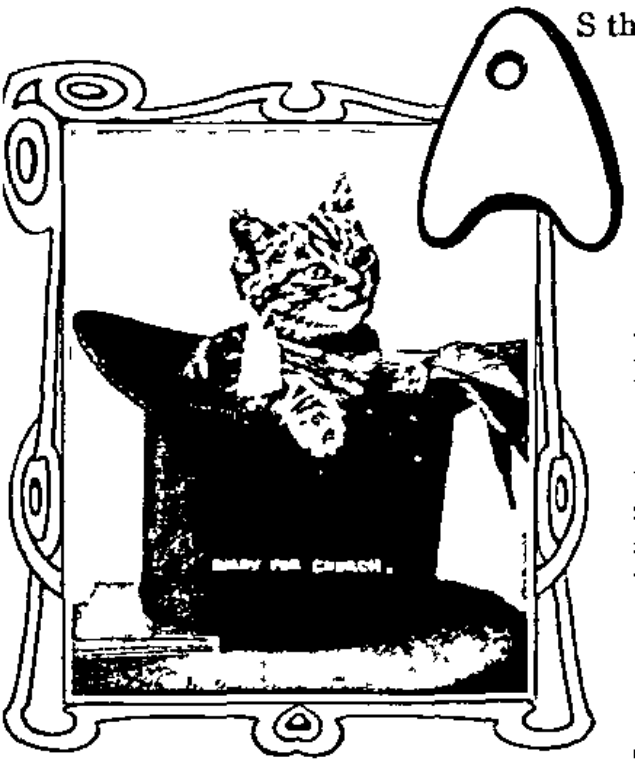
By permission of Tom Browne & Co.
Lithographers and Process Printers, Nottingham.

Colour Blocks by
Walter Hay.

From a Water-Colour Drawing by
Tom Browne, R.I.

THE LATEST ONE-PLATE COLOUR PROCESS.

By CAPTAIN LASCELLES DAVIDSON.



Half-Tone by W. T. SEDGWICK, LTD

Photograph by MARTIN J. RIDLEY

S the Editor of PENROSE'S PICTORIAL ANNUAL has kindly invited me to write a short description on the above one-plate process, I take up my unpractised pen to do so; but I am more at home dabbling in a laboratory in the hope of unravelling some mysteries of nature. I therefore crave to be excused for any shortcomings in my description of the process. Now, first of all, the system I have devised, the experimental part of which has been so admirably carried out by my respected friend, Mr. Friese-Greene, is essentially a *one-plate process*, that is to say, only *one negative* (of good gradation and density) is required to make a beautiful print in colour. This feature alone makes the process unique and of a far-reaching character, and when it is further considered that no special apparatus, colour screens or difficult colour process are required, and that a bromide print in colours can be produced and finished within 10 minutes, the simplicity of the process can be gauged. In order to attain first-class results, and as true as possible to nature, the negative must be fully exposed and developed to a good density.

The densities (representing colour in monochrome) should be as nearly as possible as follows:—

White in the original scene should be			opaque in the negative.
Blue should be	,,	,,	semi-opaque.
Green ,,	,,	,,	of middle density.
Yellow ,,	,,	,,	,, ,,
Red ,,	,,	,,	faint density.
Black ,,	,,	,,	clear glass.

It will be seen by the above remarks that the densities of the negative play an important part in the process, but the process offers such scope and latitude in correcting errors during redevelopment (which is accomplished in daylight) in colour that practically any clear good negative can be printed from. Further, the result seen from such a negative would be far more artistic and pleasing than a print made in what I may term now the somewhat uncommercial three-colour process prevalent at the present time. The next important feature in the process is that the colours are developed, or redeveloped up in the print, which

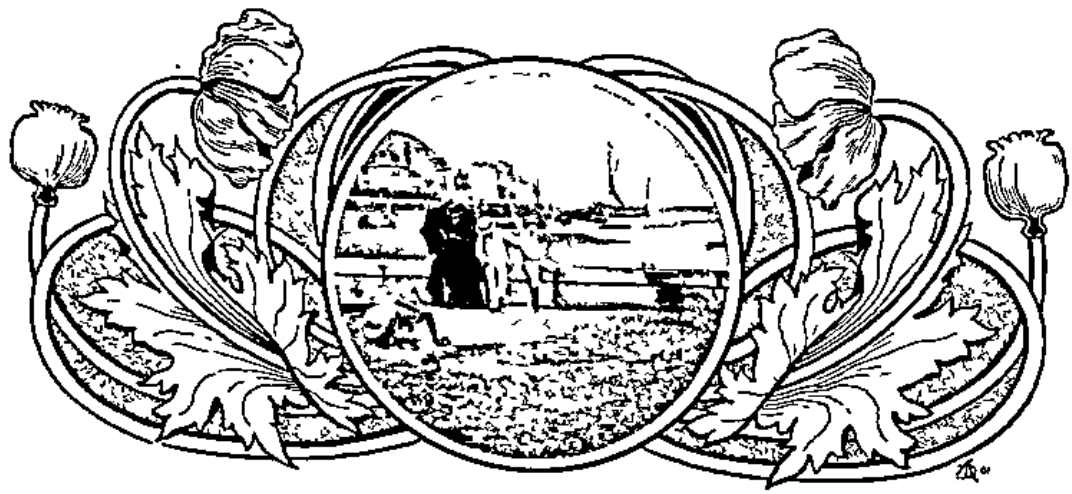
makes the finished result in colours very permanent, besides giving the operator, if artistically inclined, enormous control over the colour during redevelopment. To make myself clear on this point, I will give a short description of the *modus operandi* of the process.

First of all, a bromide print is printed, developed, washed and fixed, in the usual manner from a negative. The print is now thoroughly washed in water for five minutes and then bleached in a special bleaching compound, and when bleached the print is rinsed in water and the redeveloping colour compounds applied all over the print.

If the red developing compound is applied first only the red and yellow deposits in the print will be affected, and will develop up to a red. The blues and greens will not develop up until a developing compound for such colour is applied to the print, when the colour will be gradually redeveloped and built up in the deposit of the print The highest lights (whites) do not take any colours and wash quite clean, unless the redevelopment has been carried on too far It is only during the period of redevelopment that a bromide print shows power to select or repel a colour or colours, after which it becomes stained and untrue; but the latitude allowable in procedure before this stage is arrived at is very great. It will be seen by the above rough *resumé* that the process is very simple, and that the merest tyro in photography can at once produce prints in colours that a three-colour worker would envy

It is possible to get a result approximately at the present time true to nature by this process from an ordinary negative without knowing the actual colour in the original object and to reproduce in half-tone blocks from the *one* negative.

In conclusion I feel (though perhaps it is not my place, as the author, to say so) that there is an enormous field open and great popularity in store for this process in the very near future—a popularity specially amongst amateur photographers that will bid fair to outclass ordinary three-colour photography with all its expensive adjuncts, difficulties and technicalities. The process is now obtainable from my laboratory.



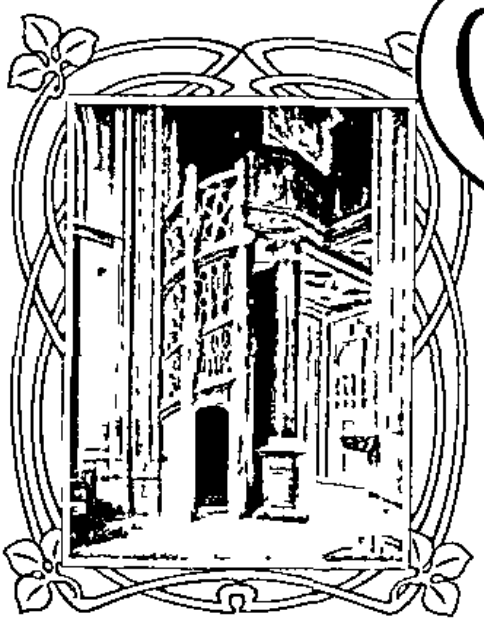
By the Sea.

Half Tone by
W. F. Sedgwick, Ltd

Photograph and Design by
A. Downer

A STRENUOUS PHOTOGRAPHER.

By THE EDITOR.



STAIRCASE TO ORGAN LOFT, ST MACLOU, ROUEN

Half Tone by E. HAMEL & Co

Photograph by REV. T. PERKINS

GENERALLY the photographer who has devoted himself to making pictures for reproduction has some interesting experiences or reminiscences to relate, and Mr. Frederic T. Corkett, the reproductive expert and manager of Raphael Tuck Sons' famous Milton House Studios, is no exception to the rule. He can tell of some moving adventures by flood and field.

In 1899 he went out to Canada on behalf of the Canadian Government and took a large series of negatives for the Emigration Department, the views being mainly of agricultural life in the Dominion, and on this journey went as far as Vancouver, British Columbia. During this tour he camped out for a fortnight in the higher ranges of the Rocky Mountains, securing realistic photographs of hunting and camping-out subjects.

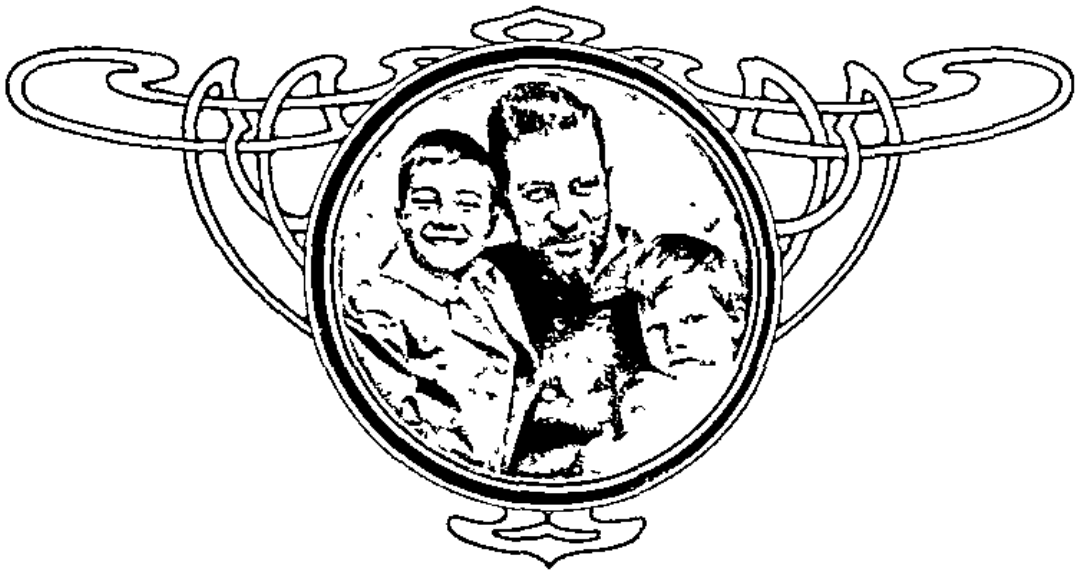
Among his curious experiences Mr. Corkett tells how he inadvertently left a hand camera in the hall of a little wooden hotel in Manitoba, and when he afterwards used this camera for such instantaneous pictures as came along unexpectedly, he did not notice until a couple of dozen exposures had been made that someone had shifted the diaphragm slot to *f*/32, when he expected it to be at *f*/8. One whole day's work was accordingly thrown away. "You can guess the expression on my face," says Mr. Corkett, "at finding this out after a day's work was done."

On another occasion he slid down a mountain side about 500 feet, together with his camera and outfit, which were smashed up, this happening 300 miles away from the next likely repair depôt. Not less exasperating was the bolting of a pack mule in the Rocky Mountains with his exposed plates, and colliding with a tree many of them were smashed, thus destroying results difficult to again secure. "I shall not forget in a hurry, either," adds the narrator, "scrambling about on the slippery seaweed rocks on the island of Sark in a gale of wind whilst carrying a 15×12 camera."

Mr. Corkett has worked every size of camera from 22×18 downwards, and knows reproduction from A to Z. He took up photography as a hobby about 24 years ago, being then apprenticed to the letterpress printing business. He can claim to have gone through the mill in this line. When he came up to London he attended the Polytechnic, studying photography, and also took lessons in collotype under Mr. W. T. Wilkinson. Photography was more attractive than the printing business, and he entered the photographic ranks as assistant to a photographer at Stamford, where, in July, 1892, he opened a studio, but in 1894 moved to Leicester. Here he laid down a collotype plant, did his own

half-tone blocks, and had a fairly successful business with stationers all over the country in view post-cards, souvenir albums, etc. Mr. Corkett was, in fact, one of the pioneers in the picture post-card business. He joined Raphael Tuck and Sons, Ltd., in 1900, as manager of the post-card department and reproduction expert, the firm purchasing his copyrights, business and connection. Mr. Corkett can, perhaps, claim to have had more of his work copyrighted than any other photographer. He has photographed in the past almost every cathedral, abbey, and ruin in Great Britain and Ireland. A great proportion of the photogravures used in the carriages of the London and North-Western and Midland Railways were made from his negatives. Readers of the PROCESS YEAR BOOK will remember a number of Mr. Corkett's admirable photographic studies in our last volume, especially notable being his views of Niagara. This year he gives us a number of charming views of Venice.

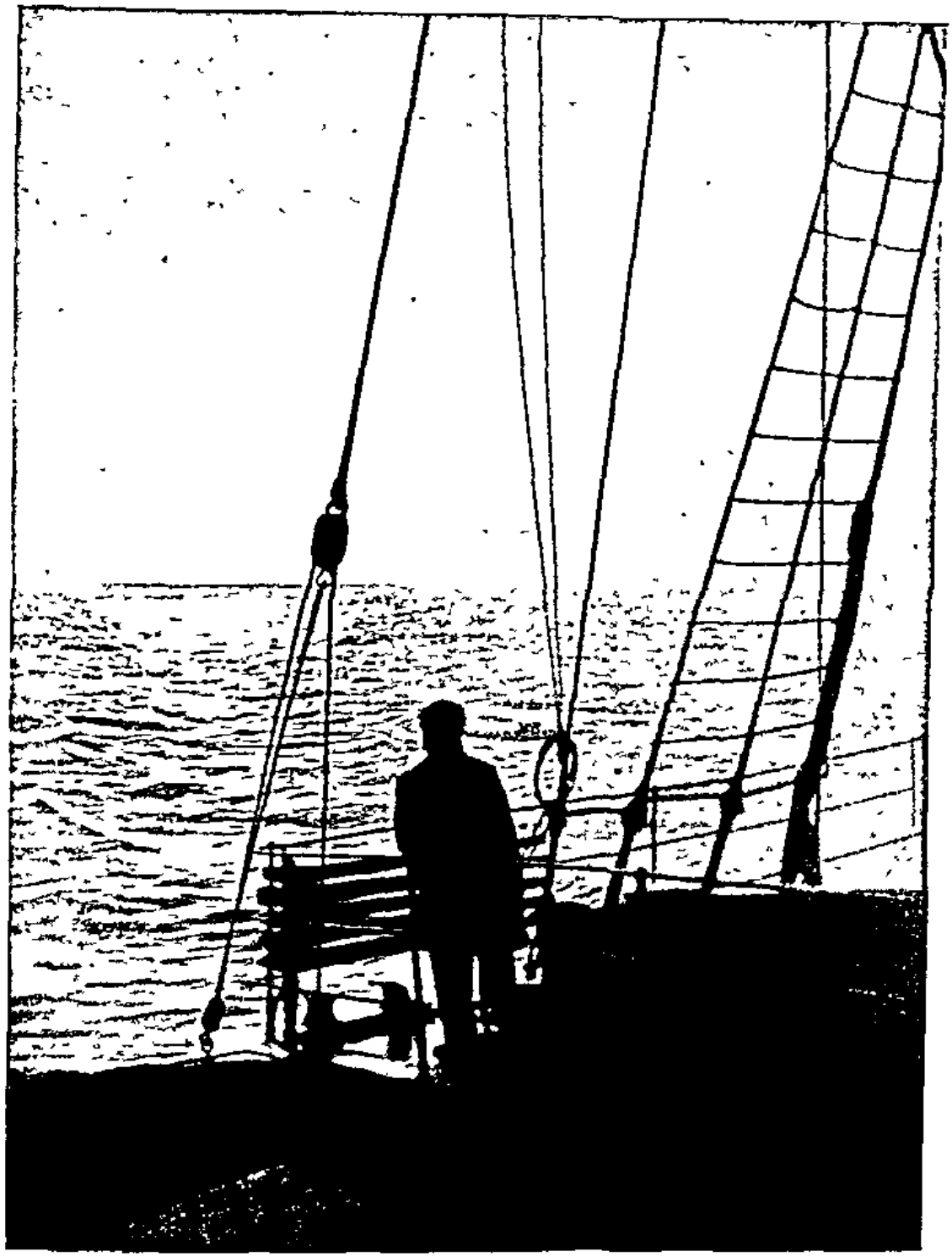
Mr Corkett has not only worked half-tone and collotype, but also photogravure and line etching, so that he can claim to be an all-round worker in process work His life has evidently been a strenuous one In America they say "we take off our hats to a man who has done things" Mr Corkett surely deserves that honour.



"MY BOYS AND I

Half Tone by
DEAN ENGRAVING CO

Photograph by
H O KLEIN



DAWN AT SEA.

Mild rose the morn: the face of Nature bright
Wore one extensive smile of calm and light "—*Richard Savage.*

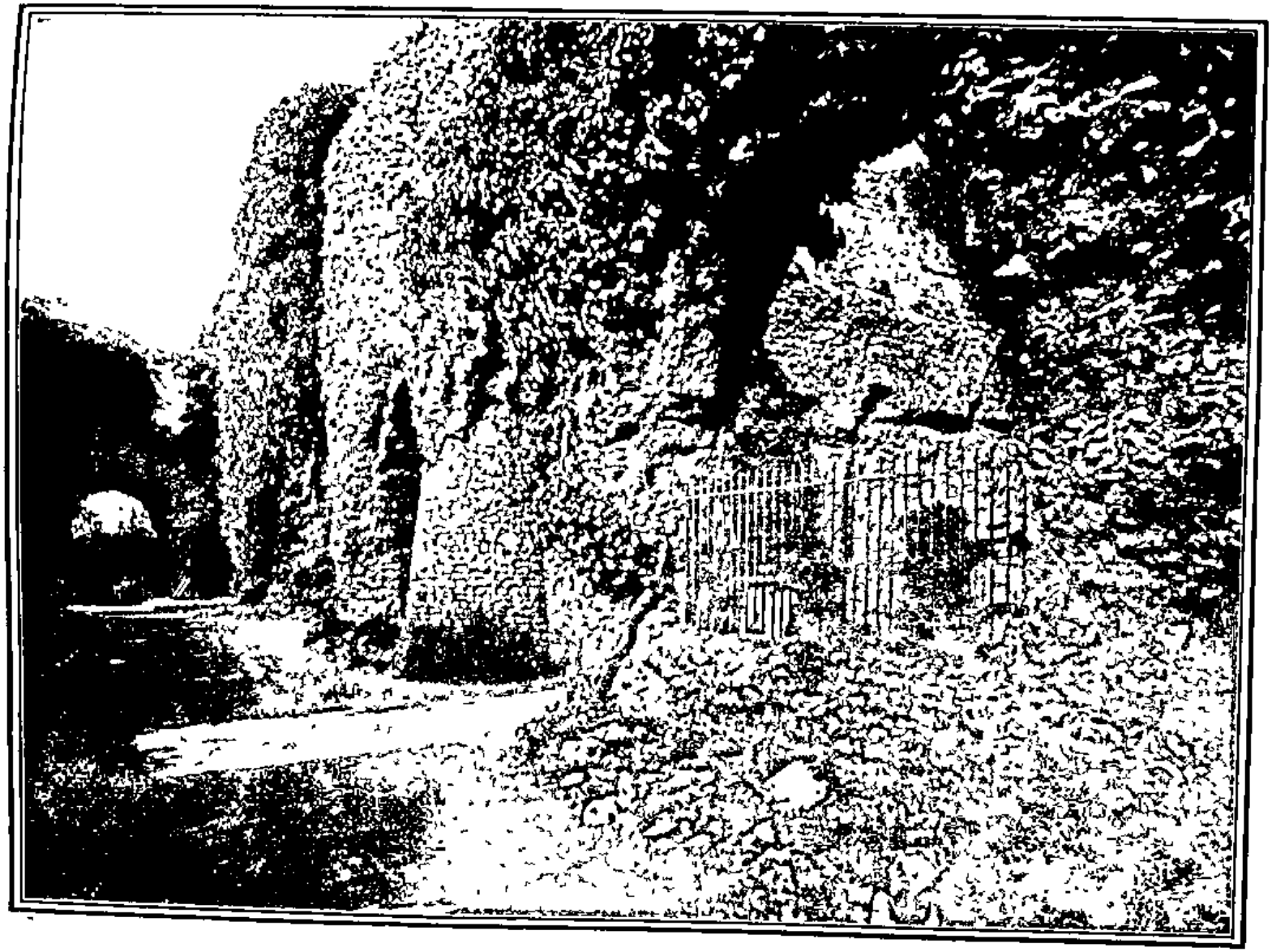
Half Tone by
S A. Cattell & Co.

Photograph by
F. T. Corkett



Block by
The Tone-Photo Engraving Co.

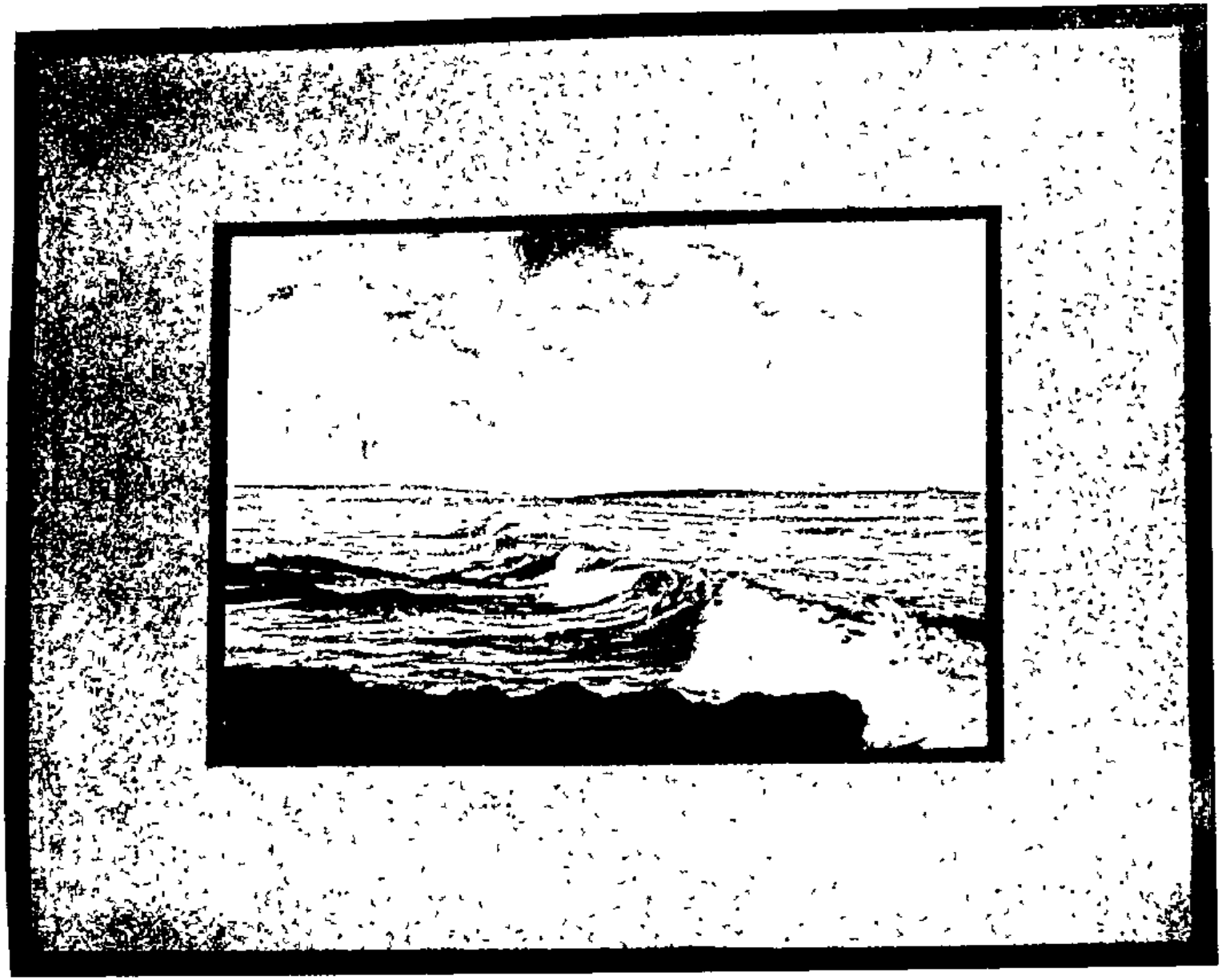
From the Water Colour by
E. A. Chadwick.

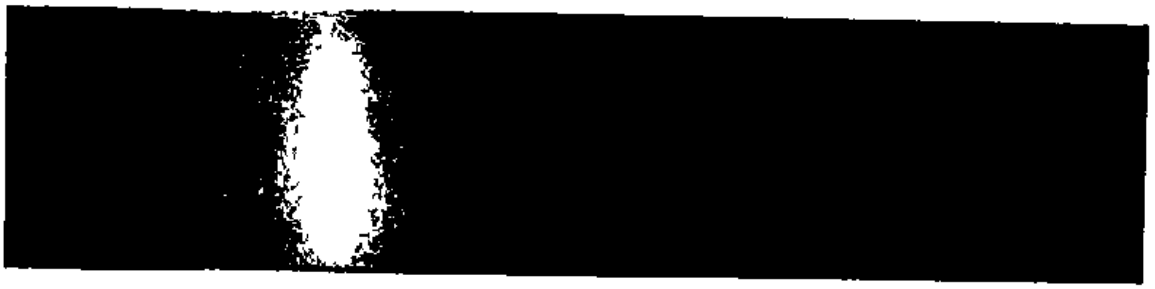


THE ABBEY RUINS, READING.

Block by
Hill & Co.

Photograph by





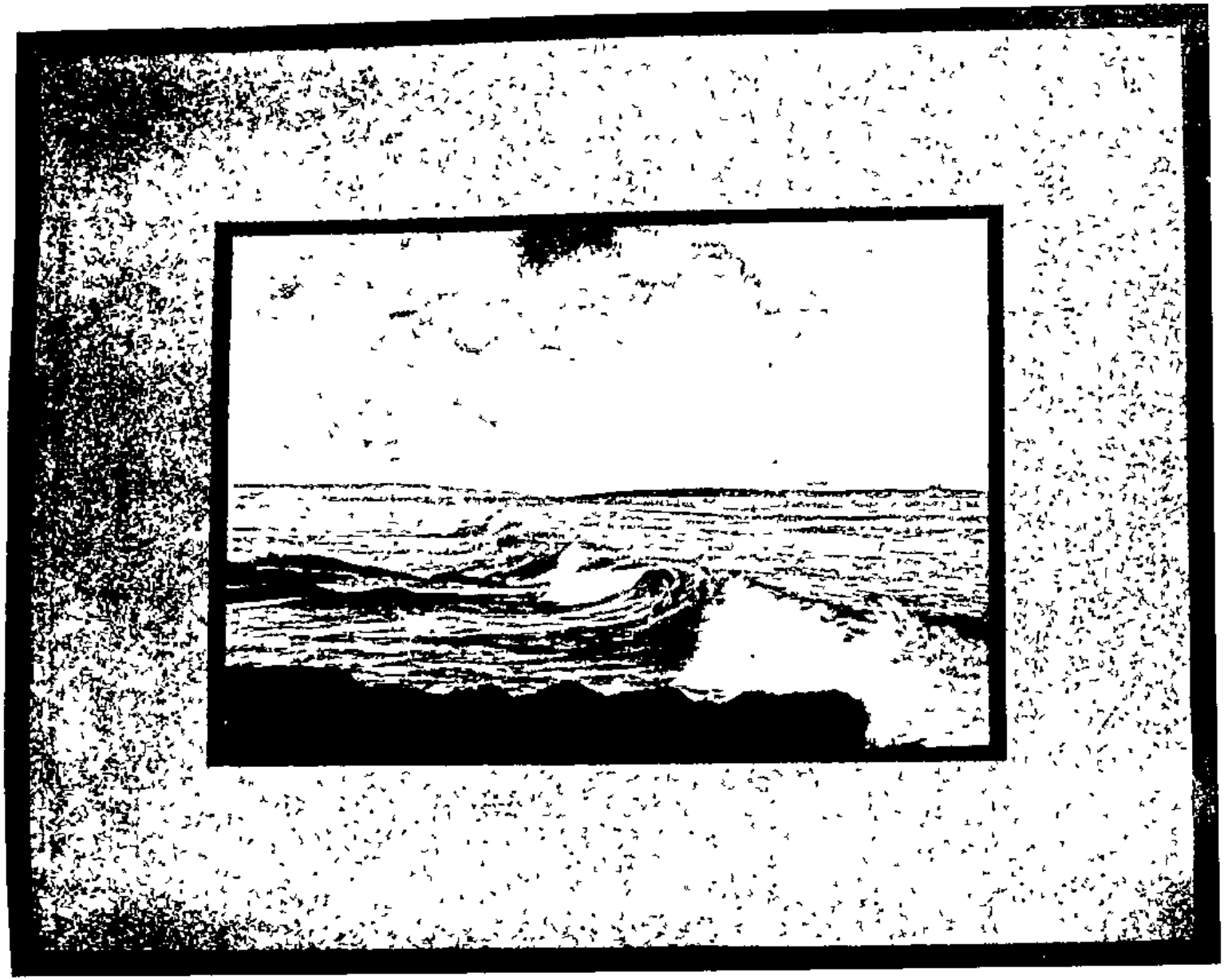




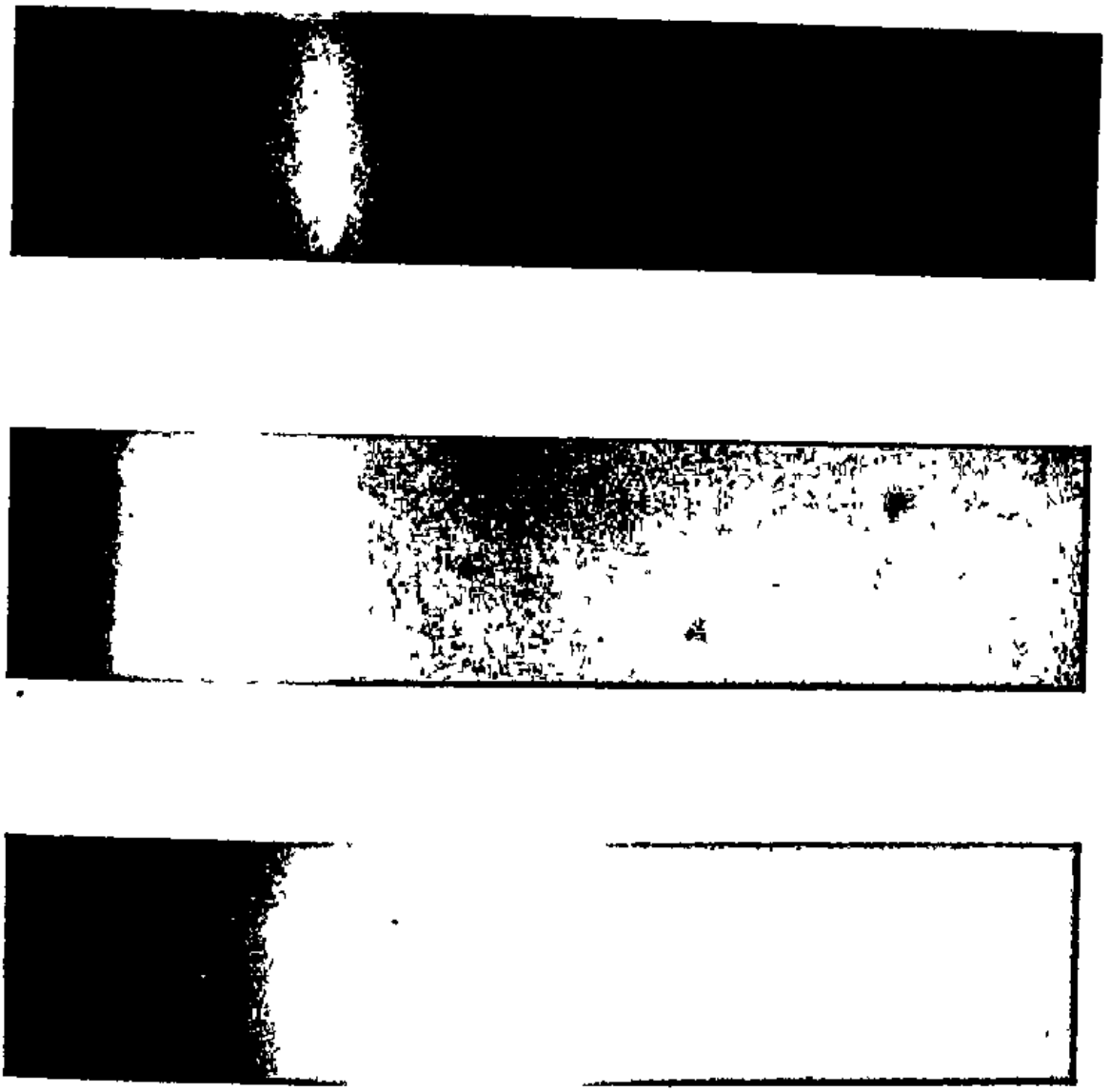
REPRODUCTION OF THE SPECTRUM OF INCANDESCENT GASLIGHT.

Half tone Blocks by
The Arthur Cox Illustrating Co., Ltd

From negatives by Mr. T. Thorne Baker
Taken with Thorne Baker Spectroscope Camera



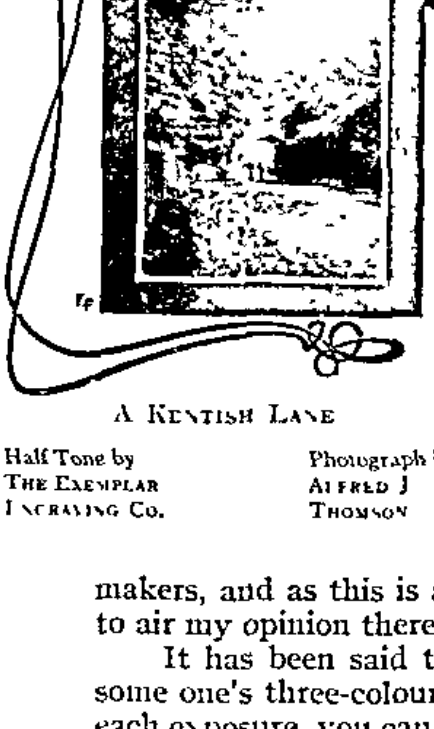
THE TURN OF THE TIDE



REPRODUCTION OF THE SPECTRUM OF
INCANDESCENT GASLIGHT.

THREE-COLOUR INKS AND THE SPECTRUM.

By E. A. Biermann.



A Kentish Lane

Half Tone by The Exemplar Engraving Co.

Photograph by Alfred J Thomson

SINCE the Editor has requested a contribution me, I do not think I can do better than pre my reproduction of Mr. T. Thorne Ba spectrum. This I reproduced at his req and he used it to illustrate a paper whic read before the Royal Photographic Soci it was also reprinted and used in the *Pr Photogram* to demonstrate the differ between certain sets of inks as supplie printers of three-colour work.

I do not consider that the object intende the *Photogram* was quite attained, princi because the reproduction was too small, but it demonstrate beyond question that a great dea the ink used for three-colour printing is quite suitable for the purpose, and arising out of this t arose a little three-cornered discussion between Baker, the Ault & Wiborg Co. and myself as to most suitable shades of ink, and Mr. Baker gav as his opinion that there could only be one correc of inks, and with this I entirely agreed; then Me Ault & Wiborg wanted to know how I accounte the varying shades demanded by different b makers, and as this is a subject of very great importance to the craft, I pro to air my opinion thereon.

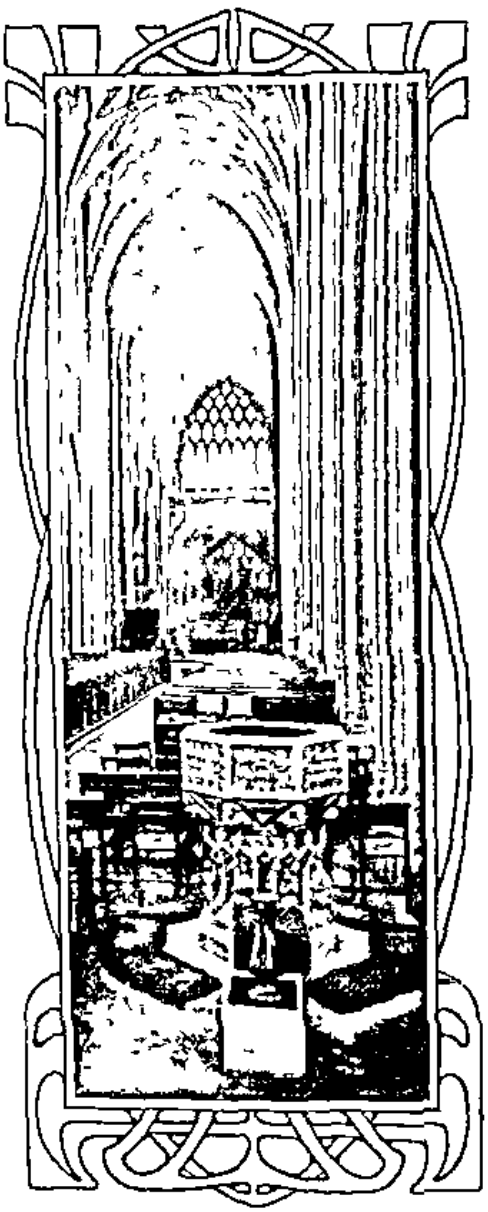
It has been said that the correct way to go to work is to take patche some one's three-colour inks and adjust your filters and plates to these until each exposure, you can transmit two of the colours and absorb the third.

I submit that this is a fallacy, preached often by people who ought to k better, but more often by people who have incorrect inks to sell, and it makes process sound so simple that the unwary easily falls into the trap. I think everyone will agree that if the gradation of the half-tone is incorrect no varia of the shade of the printing ink could possibly account for it in a reproduc of the spectrum, and if this is true, for the spectrum, it is true also for any o subject. Following out this plan of adjusting filters to inks, it is quite obv that it would be possible to do so with most unsuitable shades. Fancy tr to get a good green with a yellow which is distinctly orange, and a blue tha violet in shade, yet such inks are regularly sent out together for three-co printing.

Thinking along these lines, I came to the conclusion some nine years ago the only way to expect the process to yield correct results was to only use fil and plates adjusted to the spectrum, and then try to find the inks that w come nearest to the ideal; but not until the present year have I been abl test the theory so thoroughly as I have with Mr. Baker's negatives, and ha

that the inks are all that can be desired, we might be tempted to think that we had reached finality, but this is the point where the troubles commence.

We will suppose that we have a set of filters and plates perfectly adjusted to the spectrum, and it does not matter whether we are using collodion emulsion, a panchromatic dry plate or dyeing our own dry plates, for each colour sensation· whether we work direct or indirect, the difficulty remains the same. We have to reproduce not only colour but perfect gradation, and this is where theory begins to differ from practice, because it is found that there is always a flattening of the tones at both ends of the scale, and whatever dodges are resorted to to overcome this it is, like the poor, always with us although it varies with the speed of plate and with different classes of originals This gives the opening for the fine etcher, and supposing that the photographic portion has been reasonably well done, it depends almost entirely upon him as to what strength of colour, quite apart from shade, will be required in the printing of the blocks. All printers know how difficult it is to print several sets of blocks together, even though made by the same maker, but to try to print blocks by different makers together is almost out of the question. All this comes about because there is no recognised standard in any part of the process and, more than any other, in the inks.



St Mary Redcliff Church, Bristol

Half Tone by Photochrom Co., Ltd

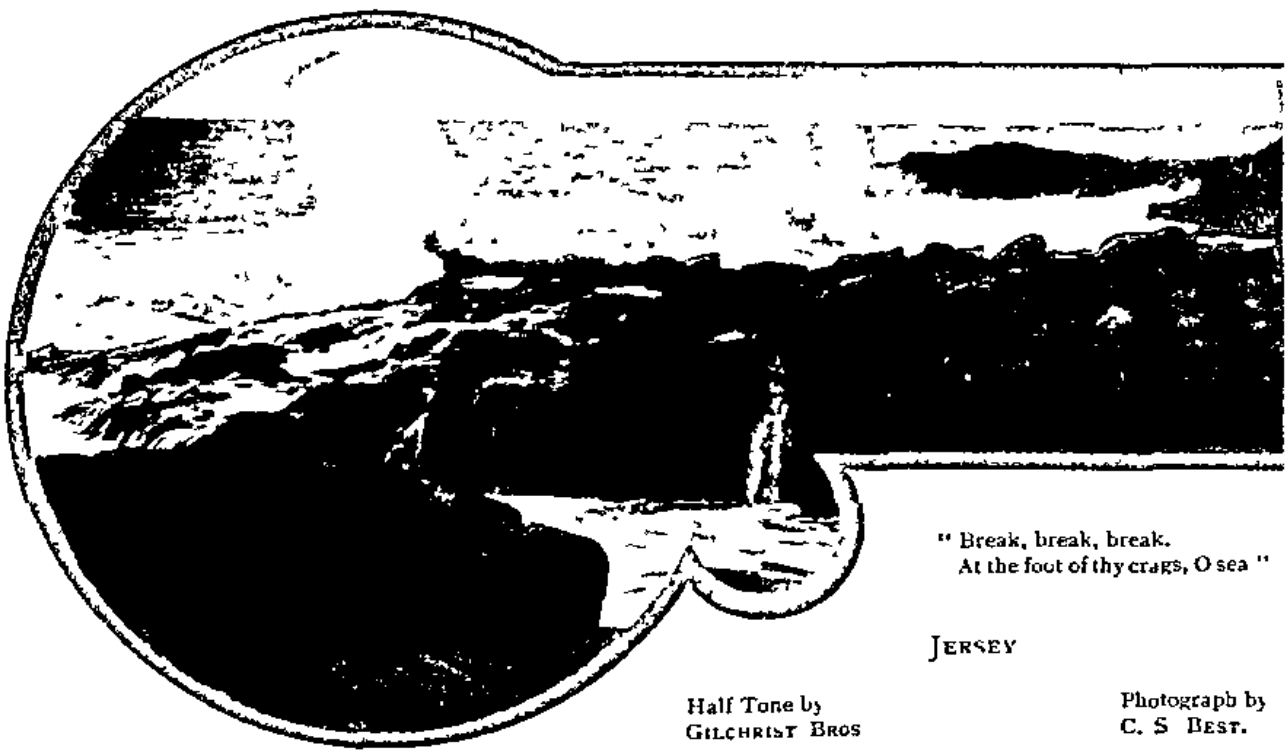
Photograph by H C Leat.

What is usually done, one would think, is that some one purchases the inks either because the price is right or that they work well on machine, or some other reason quite apart from the scientific side of the question, and the etcher is supposed to work to them, and from the very nature of the process of half-tone etching as usually practised, he is enabled to a certain extent to meet the deficiencies of the inks, and this in my opinion is the reason for the varying demands of block makers for different shades of inks for three-colour printing. I am looking forward to the time when this will be altered, as I am quite convinced that when we have a standard set of inks the etchers will work to them as well as any other.

The inks chosen to print the accompanying spectrum have not been specially made for the purpose, but are a set in constant use for commercial printing. I do not think that any reproduction on paper could ever give the brilliance of the original, so what I have sought to do is to find a set of inks that will give, when mixed in the printing, the spectrum primaries as

pure as possible, consistent with the necessary body to produce a good black by a combination of the three solids; a more brilliant effect would be produced by reducing the colours with varnish, but as that could not be done in the ordinary way of printing, I think that it would be misleading to do so in this.

In conclusion, I would like to say that it would do much to simplify matters and make the process more commercial if some body who can be looked up to as an authority, the R.P.S. for instance, could take the matter up and endeavour to standardize the shades, when I think that all the ink makers would rise to the occasion, and we should be one step more in advance.



" Break, break, break.
At the foot of thy crags, O sea "

JERSEY

Half Tone by
GILCHRIST BROS

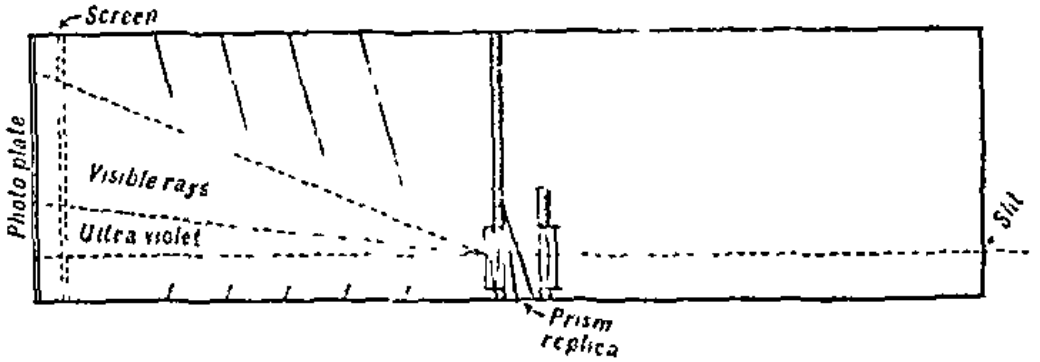
Photograph by
C. S BEST.

NEW PROCESS DIFFRACTION GRATING REPLICAS AND A MODIFICATION OF TALLENTS' SPECTROSCOPE CAMERA.

By F. E. IVES.

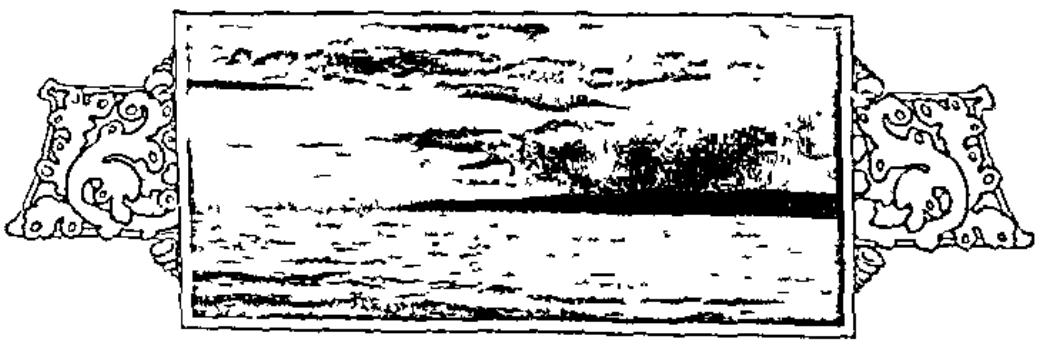
BY making the casts with a new composition, putting them face down on the glass, and then sealing up with a balsam mixture under another glass, *the writer is now making* replicas of Rowland diffraction gratings which define like originals, and are no more easily injured than glass prisms.

Most of these replicas, for which there is already a large demand, are sealed between two plane parallel glasses, but some have been sealed between two 7° prisms, and such are used in a modified form of Tallent Spectroscope camera of which a sectional view is given herewith



SECTION OF IVES' MODIFICATION OF TALLENT'S SPECTROSCOPIC CAMERA

The axial ray enters the camera near one of its sides, because the compound prism replica instead of being direct vision for the middle of the spectrum, is direct "vision" for about the limit of the ultra-violet in sunlight. In other respects the camera differs from Tallent's only in having a special screen in front of the plate, consisting of a clear film of gelatine on patent plate glass, deeply stained with naphthol yellow on the part which covers the spectrum from A to E. By this means, the action of the overlapping of the ultra-violet of the second order spectrum is eliminated, without affecting the action of any rays belonging to the first order spectrum, a matter of considerable importance.



CLEARING OFF AT SUNSET

Half Tone by
ARTHUR COX ILLUSTRATING CO., LTD.

Photograph by
THOS KENT



CHURCH INTERIOR.

Three Colour Blocks
by De Reproductie Compagnie
Rotterdam (Holland).

Water Colour Sketch by
W Hoogenbos

NEWSPAPER HALF-TONES.

By FRANK COLEBROOK.



Coarse Grain Newspaper Half-Tone
Designed and Etched by
CARL HENTSCHEL, LTD

"THE opportunity of a lifetime must be grasped during the lifetime of the opportunity." The aphorism is in my mind as I think of 1905, and its special date-marking, in newspaperdom. In 1855 there were tax remissions, affecting newspapers, which induced the starting of quite a number of daily papers in that year. It was in 1855, too, that the first essay was made in coloured journalism in this country. I am writing these notes in mid summer, and while several months still remain to this double jubilee year, 1905, I am wondering if some newspapers which are clearly in a ripe stage for development along lines of better use of half-tones, will mark this year of commemoration by making such advance, or if instead of this they will let the jubilee months go by and ultimately find that they have postponed decision to improve or extend their half-tone illustrations until some rival journal has taken the wind out of their sails.

It will look as if some newspapers (which by all considerations *ought* to move) are really past praying for, if they do not get a half-tone hustle on them very soon. For they can't say they have not been reminded of the new power to serve them. One influential platemaker, almost indicated in the adjective, has this jubilee year bombarded them with a publication called "Newspaper Illustrations." This has been produced on paper costing less than 1¼d. per lb., and the printing of half-tones and type has been from stereos. The paper, I believe, was the identical make specially adopted after a lot of experimentation by a comparative newcomer into London's daily pictorial journalism; a halfpenny paper which depends absolutely on its half-tones for its very existence; and which, of course, prints on a rotary, and at about 40,000 an hour. As supplied to the daily customer above alluded to, by eminent and enterprising paper merchants, this news sheet has a distinctly smooth "skin" upon it. Curiously, the printers of the "Newspaper Illustrations" sheet seem to have taken this skin off, by damping presumably, for some or other reason. But, anyhow, "Newspaper Illustrations" amounted to the sharpest wake-up the British or Irish editor has had for some years.

Similarly on the Continent the move towards better and better half-tones in



Coarse Grain Newspaper Half Tone
Designed and Etched by
CARL HENTSCHEL, LTD.

newspapers has been quite remarkable. It is not comforting to reflect that *Der Tag* (Berlin) is the best thing we see produced anywhere in the world, in the way of a half-tone illustrated daily. It happens that *Der Tag* is produced by plates in which the make-ready is present in the plate itself, after the Dr. Albert method. That is to say, a deeply etched second plate from the same negative is forced into the back of the first plate under hydraulic pressure, the shadows are domed up The electro duplicates are also by an entirely new method of moulding which requires no metallising whatever. From whatever causes, *Der Tag* sets a splendid lead. Meantime, even without at once achieving so very high a mark, our newspapers may easily go a long step forward, and in doing so may help themselves very greatly. They probably would be very surprised could they read the working of all advertisers' minds, so far as concerns our subject. There was quite a droll incident a while ago, for the truth of which Mr. Frank Lloyd, of the great newspaper and paper-making firm, will vouch. He tells us that a gentleman was asked why he was letting his advt. appear in a certain journal whose connection with his business seemed to be quite remote; and he admitted it was not at all an organ which well suited his business, but he added, "I've really given them my ad. because I've a half-tone in it, and they always make the half-tones in their advts. look so remarkably well!" We've heard of the æsthetic young man who broke off an engagement because the girl's complexion did not suit the furniture he desired to buy, and this instance of passing by the suitable journals because of their unpleasing half-tones is somewhat of a parallel.

There must be a great number of provincial journals whose circulation has not attained and hardly can be worked up to very large figures. Geography, population, politics, a number of things determine that. The profit, however, may be very good; and it might very well justify an added expense in the way of half-tone illustration directed towards enhanced advt. revenue. I was lately in the office of a very large and successful advertising agent. His chief confidential helper and "advt. copy" maker, a man of large American, British and Continental experience, said, "Take it from me that the half-tone is badly wanted by the advertiser." "Might do newspaper men good," he added, "to hear the comments in the offices of some of the big advt. agencies on newspapermen's ways of dealing with advertisers. Some would perhaps be startled at the amount of business they would secure if they were to show just a little more enterprise and a little more desire to help their advertisers in all ways consistent with good



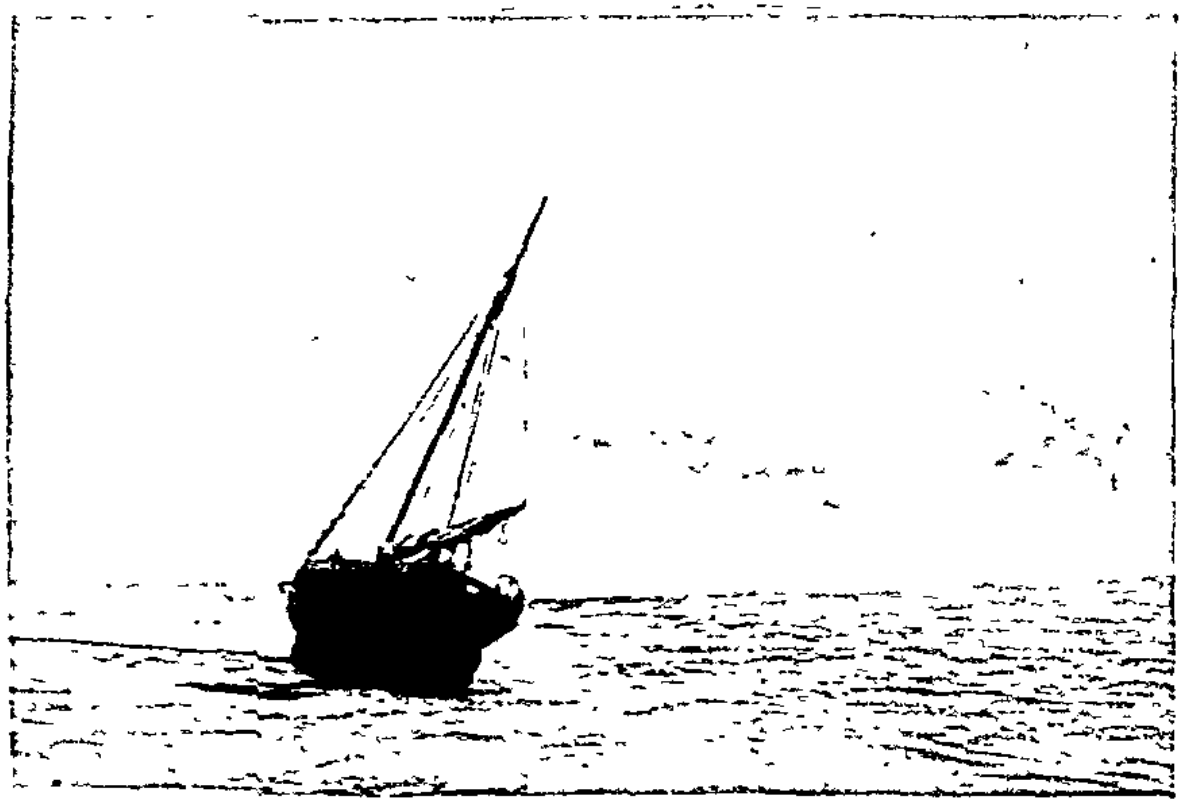
CARL HENTSCHEL

Coarse Grain Newspaper Half Tone, with Line Border.
Designed and Etched by
CARL HENTSCHEL, LTD.



CASSIOBURY HOUSE, WATFORD.

Photograph and Three Colour Blocks by
Frederick Downer & Sons



THE SMUGGLER.



A MEDALLION.

Four Colour Blocks by
The Zeese Wilkinson Co., New York.

Printed from
Nickeled Sheets.

printing surface, because of avoiding the loss of time occupied in the return movement of the bed in the flat-bed machine.

In relief printing machines the rotary principle is chiefly applied to newspaper printing, but unfortunately in this important branch of work practically everything has to be sacrificed to speed in all departments, with results that are none too pleasing, more especially do "process" illustrations suffer in the stereotyping, sometimes from conservatism, which is slow to modify methods in use, so as to adapt them to the requirements of *fine* half-tone blocks To particularize, it is only necessary to mention the totally unsuitable "flong" which still persists among so many stereotypers, who with a material better adapted for the work would readily obtain more satisfactory results.

Rotary machines for relief printing are also used for the production of some of the monthly magazines and for the printing of pamphlets; with such illustrations have more chances of successful printing, because "hard metal" stereos are mostly used; sometimes the illustrations are electrotyped and cast into the stereo of the type matter, and in a few isolated cases bent electros of the whole forme are used for printing, the "shell" being bent before backing up. this method, however, has considerable practical disadvantages which are not easily overcome.

Methods such as the foregoing are only satisfactory where excellence in the quality of the results is not essential, but for the rotary printing of half-tone blocks of fine grain, the prints from which are required to equal the standard of quality produced on flat-bed machines, it would be more advantageous to print from the original blocks instead of being obliged to work from reproductions. Many attempts have been made to do this, but without complete success. The method adopted is to bend the half-tone plates to the necessary degree, but the mechanical difficulties are considerable, and there appears to be no bending machine entirely satisfactory for high-class work. If the plate after bending is not "true," that is to say, has not been given an accurately cylindrical surface, high-grade work cannot be done. The possible solution of the problem is to bend the copper before the block is made, a plan which does not present insuperable difficulties to the photo-engraver.

Lithographic printing as such has been supplanted for many classes of work by other printing methods, but zincography and algraphy have made rotary surface printing practicable, enabling the work to be produced more economically. Surface printing offers considerable advantages from the standpoint of the preparation of illustrations, because of the simplicity of the photo-zincographic and photo-algraphic processes, and compared with the production of relief blocks the saving in the time of etching alone is worthy of consideration.

With regard to intaglio printing, the rotary principle has been applied to greater advantage than in either relief or surface printing, in that, whilst its adoption is essential if prints are to be produced at a very rapid rate, a high degree of excellence is at the same time possible.

The printing of an intaglio plate by hand is a tedious matter owing to the several operations involved and the skill required at each stage, the wiping of the plate especially requiring considerable care. For this reason the mechanical printing of intaglio plates is by no means an easy problem. Several forms of "die" presses for printing from flat steel dies have been introduced, but their sphere of usefulness is comparatively restricted.

The application of the rotary principle to intaglio printing has opened out almost endless possibilities. The mode of procedure is as follows:—The work is engraved by suitable means on a cylinder in intaglio, and the method of

printing is to fix the engraved cylinder in a special form of printing machine, with its surface in contact with the paper which is carried round the bowl of the machine with a blanket between the two; the cylinder is supplied with ink in some convenient manner, and the excess of ink is removed by a steel knife edge or "doctor," the inking, clearing and printing all being peformed during one rotation of the cylinder. If the "doctor" is in good condition and properly adjusted, the amount of wear on the engraved cylinder is slight. Rotary intaglio printing offers considerable advantages in certain branches of industry, such as calico printing, where it is necessary to "carry" a large amount of ink or other printing material, which amount will depend, within limits, on the depth 'of the engraving without there being any delcterious effect on the work, whereas in relief printing only a relatively small quantity of ink can be carried—any excess "squashing" or at any rate thickening the work and making it appear coarse. Some method of rotary printing is essential because the design is continuous—the length of the same being equal to the circumference of the engraved cylinder or a sub-division of it.

For pictorial purposes, intaglio printing (as can be seen in copper plate, aquatint or mezzotint engravings) has a certain "quality" which gives prints produced in this way a particular charm—the work appears in the prints to have a depth and richness that cannot be produced by any other means Unfortunately, photo-mechanical work in intaglio has received comparatively little attention up to the present, and a large amount of work remains to be done. Talbot-Klic photogravure is universally acknowledged to be one of the most beautiful of the photo-mechanical processes, but its very delicacy renders it unsuitable for mechanical printing. There are modifications of the photogravure process being worked which have a ruled screen basis, the necessary breaking up of the surface and the depth being thus obtained. The details of the processes are not published, but intereneralIy assumed that the printing is done on the rotary principle. (It is interesting to note that a plate mark only appears on the best work.) The principal work done is the printing of high-grade "plates" and supplements, produced at a much lower cost than formerly; but there still remains the field for work already mentioned—untouched. A periodical entirely printed by intaglio methods—text as well as illustrations—could be produced at a low cost if the edition were large, and the popularity of such a publication would be without question. Simpler methods of working than those in use would have to be devised, because they are too intricate to be used as "commercial" processes, where speed and certainty in the making of the printing surface are essential factors towards success.

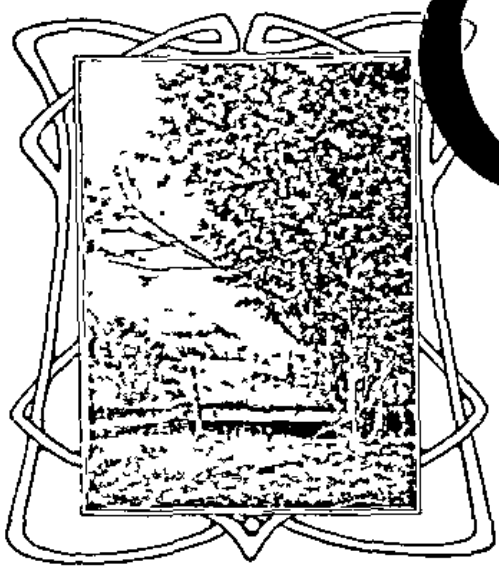


A Gipsy Encampment

Design by
Harbor & Franklin.

Photograph by
F. B. Tark.

A HANDY CALCULATOR.



THE DISTANT SCENE

Half Tone by MARSHALL ENGRAVING CO Photograph by J C PHYTHIAN

CARL NORMAN, whose name is very familiar in the photographic world, and who for many years has been the manager of the Photochrom Company's works at Tunbridge Wells, has just perfected another very useful invention which will prove to be a great boon to those who are engaged in process block work For a long time past no little trouble, and oftentimes great delay, have been caused through the measurements quoted for blocks being found by the operator to be out of proportion, which necessitated the picture being either cut or reduced, frequently to the dissatisfaction of the customer and detriment to either This, of course, is principally due to the fact that a customer has a given space for his picture to occupy, and he, in many cases, instructs the process block maker to produce a block accordingly, often without regard to the proper proportions of the picture. What follows, the firm who makes the block, is fully aware of. The customer has to be informed that the picture will not reduce or enlarge, as the case may be, delay is caused by the correspondence that follows, and disappointment frequently falls in its train.

Mr. Norman has satisfactorily overcome those difficulties by the invention of a proportional measure, by which the exact proportions of a picture can be immediately and accurately ascertained. This measure is simplicity itself, and is supplied at a very low figure, which brings it within reach of all who have to do with process blocks.

The invention is protected by patent, and there is sure to be a big demand for this useful yet simple article. Mr. Norman is well known as having brought forth a number of inventions in the past, each of which has proved of great utility, and we hope that this latest ingenious product of his fertile brain will meet with the success it deserves We expect by the time the YEAR BOOK appears in print to be able to supply our friends with this handy article.



LITTER OF PIGGIES

Half-Tone by THE EXEMPLAR ENGRAVING CO Photograph by MARIE LEON



FLIRTATION.

Half Tone by
E. Hamel & Co.



"IT'S YOUR TURN."

Half Tone and Border by
Pawson & Brailsford

Photograph by
W J Bates



IN AN OLD CAPE ORCHARD.

Block on Zinc by
E J Akerman
(Gold Medalist, Cape Town Exhibition),
Argus Co , Capetown

Photo by
Elliott



A CHARMING LITTLE STUDY.

Half Tone by
Philipson, Son & Skilleter.

Photograph by
Reinhold Thiele & Co



STEPPING STONES.

Half Tone by
Rhinelander & Co.

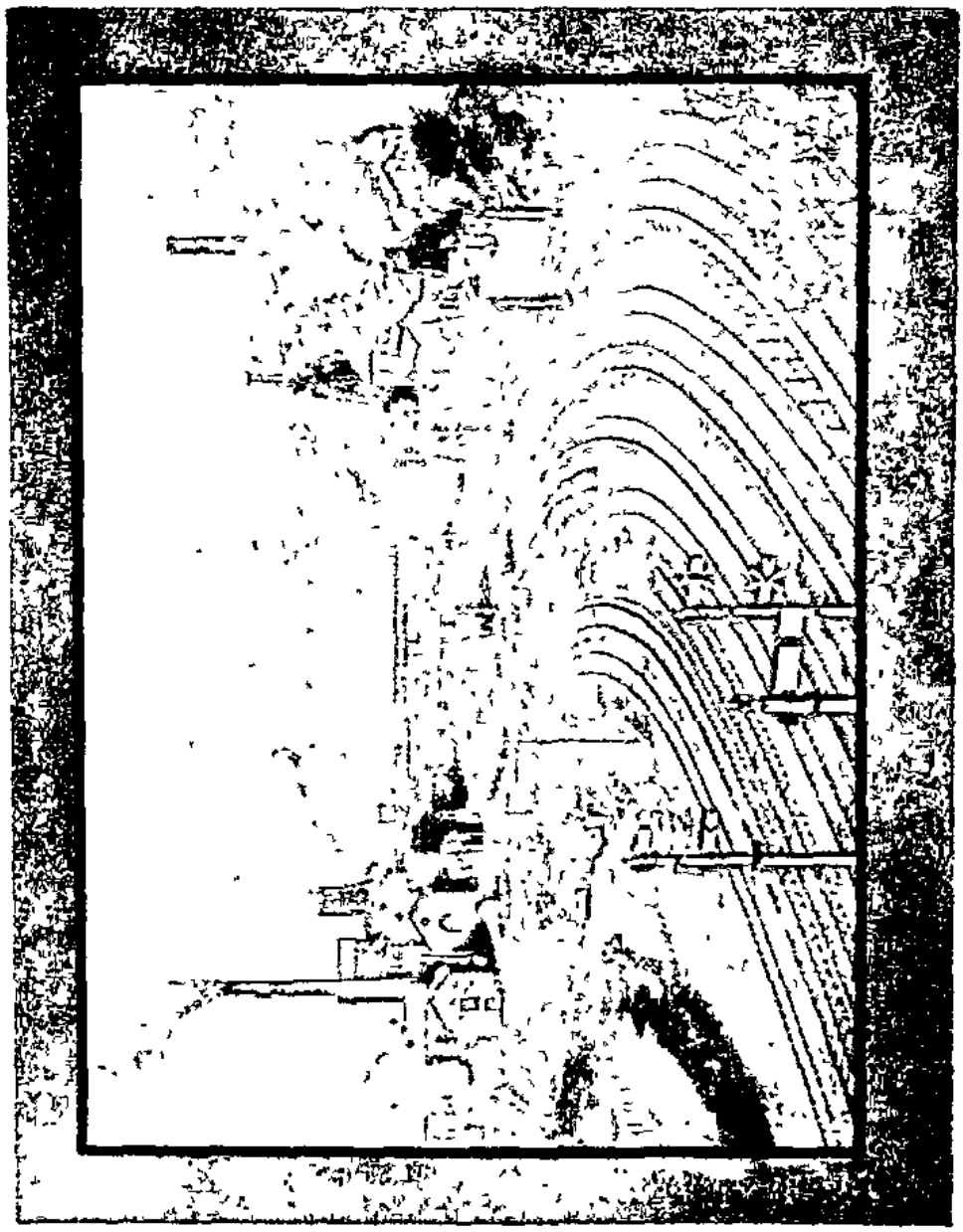
Photograph by
Reinhold Thiele



AMONG THE BURNHAM BEECHES.

Half Tone by
British Photo Engraving Co

Photograph by
Mrs Catherine Weed Ward





MISS MORRIS CLARKE.

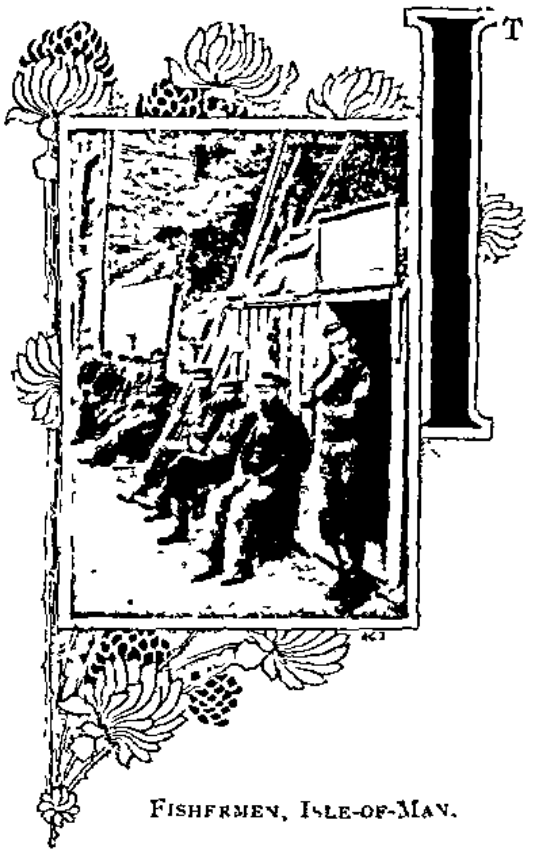
One of the Gibson Girls in "The Catch of the Season."

Half Tone by
Ashworth & Meredith

Photograph by
Alfred Ellis & Walery

CHEAP PICTURES.

By FRANK M. SUTCLIFFE.



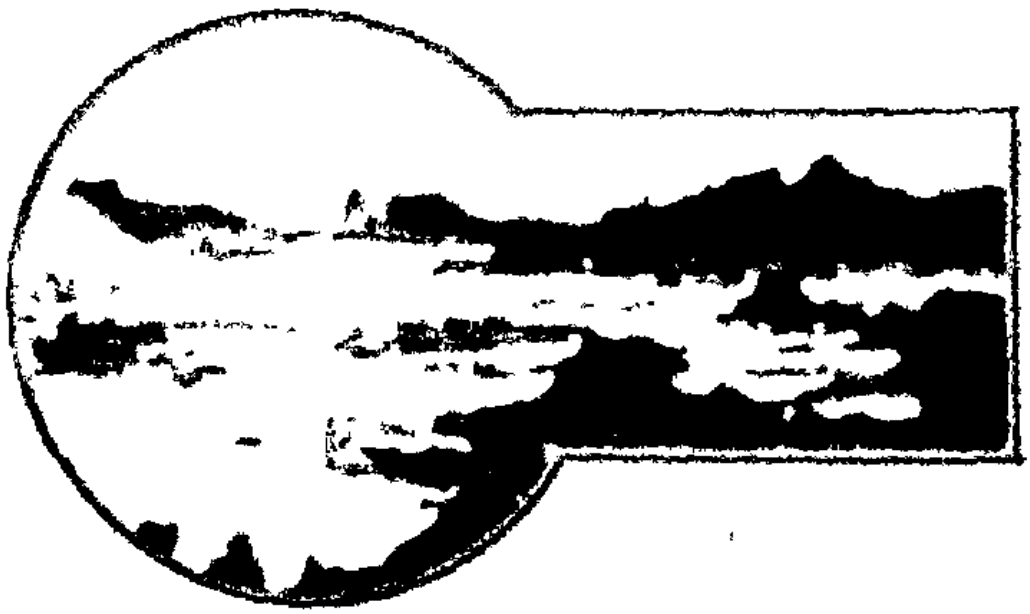
FISHERMEN, ISLE-OF-MAN.

Design and Block by LASCELLES & Co., LTD. Photograph by W. P. THOMSON.

IT is a well-known fact that thousands of people are killed every year by street noises such as are made by German bands, barrel organs, street pianos, etc. Slowly our local authorities are stopping these noises, and we shall live longer. These noises have been tolerated in the past, but now we are waking up to the fact that they are not what they pretended to be. They are not and they never were—music. The Editor of this Year Book said that the noise of the Elevated Railway in New York soon got on to his nerves. There is another thing which must be equally trying to him, which must affect his eyesight instead of his hearing. I mean the sight of all the illustrations sent in for the Year Book. I wonder how many of these sing in tune—perhaps one in a hundred. To what shall I compare the ninety-nine? Rather to the noise made by a German band than that of the Elevated Railroad. The latter is surely more honest than the former, for it does not pretend to be music, while the noise of the German band does.

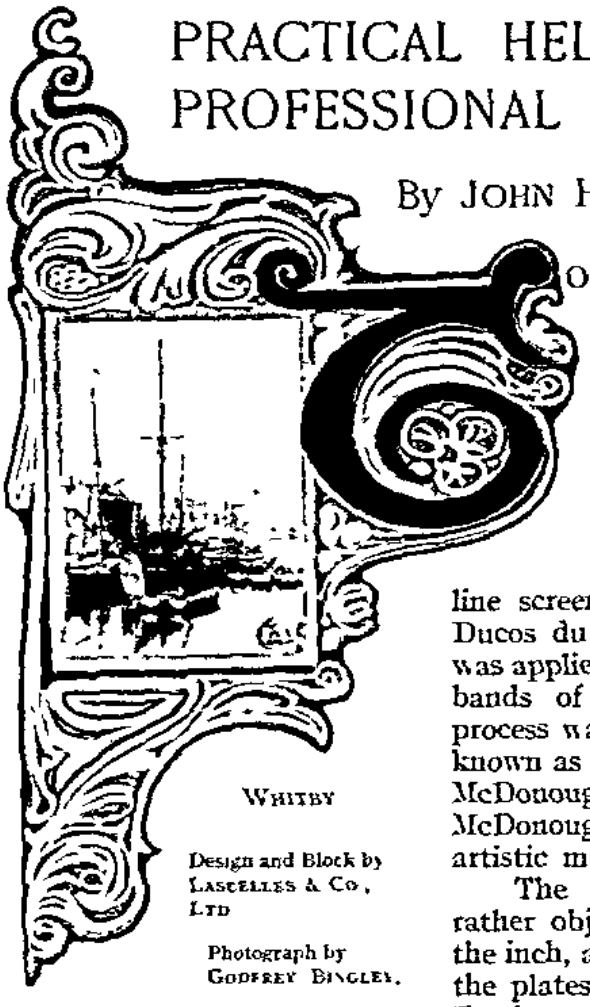
Yes, the danger of the age is that while the State has risen to a sense of its duty in keeping our ears from profane noises, it allows all kinds of horrible, and worse, things to hurt our eyes. Every illustrated newspaper is full of things which pretend to be pictures, but which are as much pictures as noise is music.

One does not expect to find pictures in a manufacturer's catalogue, but if we could only see what pains one often spent in getting and finishing such illustrations we should not throw them aside so quickly, but one does expect pictures instead of illustrations in the better magazines and illustrated newspapers. Yet week after week and month after month appear things which are anything but pictures. Now comes the strangest part of my story, the payment received by the producers of the illustrations in the manufacturer's catalogue is often ten times as great as that paid for the things called pictorial illustrations. Until I knew this I used to wonder why so many things which had no pictorial merit "came out" in the papers week after week. For some misguided reason or other the editors of papers refuse to buy the best work and to pay a good price for it. Instead they flood the world with fifth-rate work, paid for at a cheap rate. What is the consequence? Every one is either growing blind, or mad, unless he has the sense to shut his eyes to the mass of rubbish which fills our papers.



PRACTICAL HELIOCHROMY FOR PROFESSIONAL AND AMATEUR.

By JOHN H. POWRIE, Chicago.



WHITBY

Design and Block by LASCELLES & Co., LTD

Photograph by GODFREY BINGLEY.

TO those who are familiar with the various processes of natural colour photography, the recent developments that have been made towards securing a practical method of making transparent photographs in natural colours will be read with considerable interest. The process I am about to describe is a modification evolved from the colour line screen which was first suggested by Louis Ducos du Hauron in 1868, in which the colour was applied to the plate in fine parallel juxtaposed bands of the so-called primary colours. The process was subsequently developed by Dr. Joly, known as the Joly process, and also by James W. McDonough, of Chicago, known as the McDonough process; and results of considerable artistic merit were attained in both processes.

The lined appearance of the plates was rather objectionable, being from 250 to 300 to the inch, and the difficulties of being able to make the plates and screens coincide were very great. Further, the cost of ruling the sheets of glass, with the colours having proper light absorptive values to obtain satisfactory results, was prohibitive.

The plates produced by the Powrie-Warner process are structurally different, and the manner of using them is greatly simplified.

Sheets of ordinary negative glass are coated with bichromated gelatine, and exposed to the light through a negative plate of transparent and opaque parallel lines. The light passing through the transparent lines of the negative renders the gelatine insoluble in warm water, the unexposed portions washing away, thus securing upon the glass colourless gelatine lines, which with the plates now in use are from $\frac{1}{600}$ to $\frac{1}{1000}$ of an inch in width.

The plate is then immersed in a colour bath of a suitable green dye, and then in subsequent baths to render the colours stable, washed and dried. The appearance of the glass is a delicate green tint. It is then recoated over its entire surface a second time with the bichromated gelatine, and again exposed to the light through the opaque lined negative, taking the precaution to have the green lines protected by the opaque lines in the negative, and also one-half of the remaining unexposed surface.

The plate is treated in a similar manner after this exposure as for the green lines, except that a red dye is now used, and the plate is rinsed and dried as before. The appearance of the plate is yellowish in tone. It is then recoated

a third time, again exposed, and passed into a bath of violet blue dye. This gives the plate a neutral tint from the recomposition of the three elementary colours. The surface being completely covered without overlapping of the edges.

It is possible by this photographic printing operation, with special machinery for aligning the plates and printing them automatically, to obtain remarkable uniformity The increased fineness of the colour lines renders them invisible to the eye, and registration of the lines with a transparency would be impractical.

The next operation is that of coating the plates with a panchromatic emulsion when they are ready to be exposed in an ordinary camera, developing and fixing in the usual manner, and obtaining a negative in colours. It is obvious that the exposure in this case must be made through the glass. These negatives show the red rose as green, the green grass appears purple, yellow flowers appear violet and violet appears yellow, the colours, as well as the lights and shades being reversed

In order to understand this, I should explain that light reflected from a red object passes through the red lines in the Florence chromatic plates, the red rays of light being absorbed by both the green and violet blue lines, and on development and fixation it is found the silver is deposited only upon the red lines, leaving the green and blue lines transparent over the particular area representing the red object, giving it a greenish blue colour.

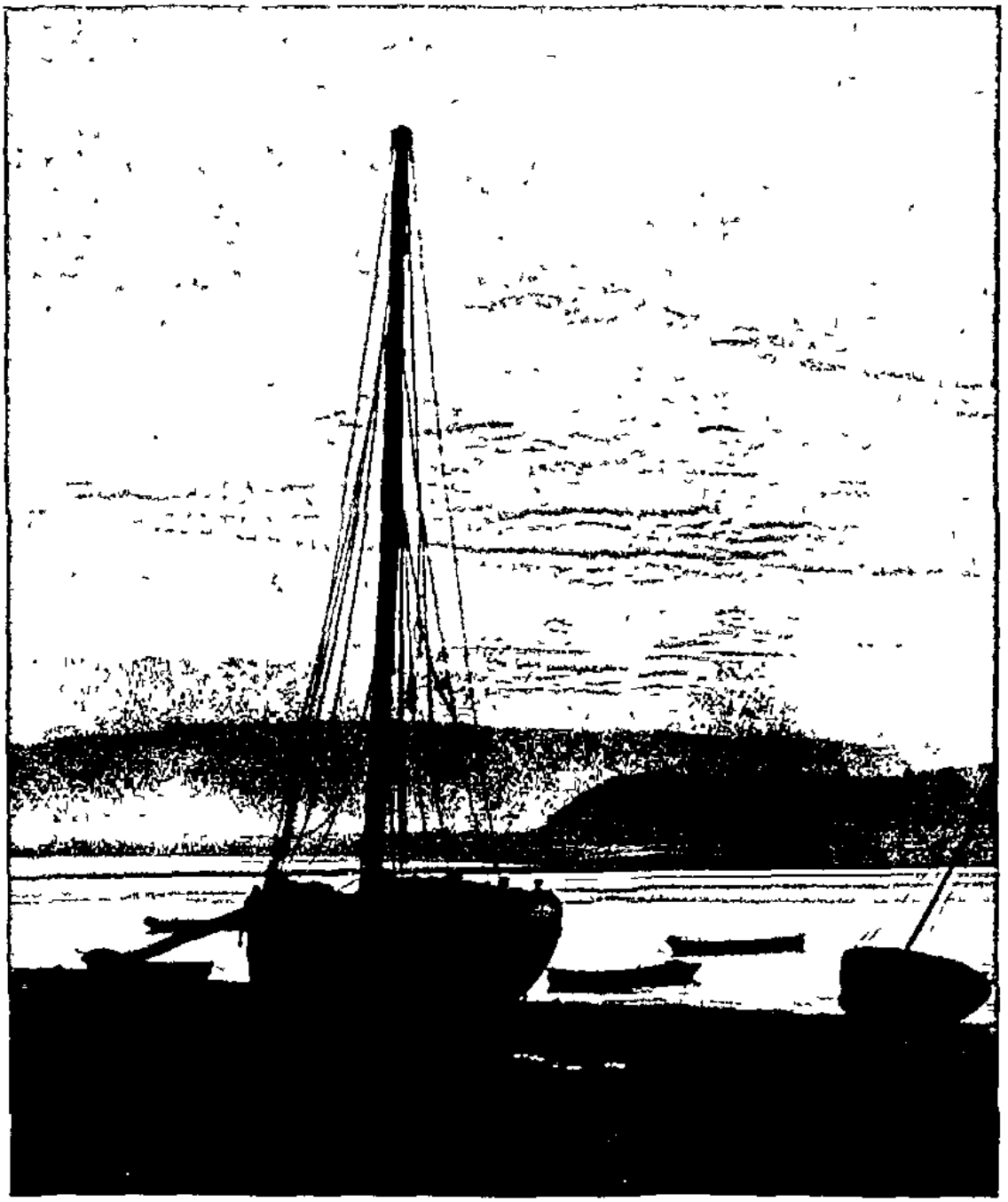
By the use of Florence chromatic transparency plates and films, lantern slides and window transparencies may be made in the ordinary way, either by contact printing, reduction or enlargement with the camera no regard to registration being necessary, as the lines are practically disregarded in this process, being merely a convenience for the manufacture of the plates only. The transparency plates differ from the negatives only in the use of a transparency emulsion upon the lined plates, which is also panchromatic.

A thin sheet of suitably tinted transparent material accompanies each package of plates and films to equalize the light values of the different colours. No additional apparatus or special skill is required other than is necessary in making the ordinary black and white negatives and slides, to secure them in colours.

The plates have been christened " Florence Chromatic Plates " as a tribute to Miss Florence M. Warner, of Chicago, for her untiring devotion in the promotion and development of the Powrie-Warner process.

A further use of the Florence chromatic plates which will appeal to the photo-engraver from a commercial point of view lies in the fact that the lined plate, instead of being coated with dry plate emulsion, may be flowed with collodion emulsion rendered panchromatic, exposed in the copying camera for coloured copies or natural objects, and by a simple process which has been practically worked out, the triple colour records for three-colour process blocks can be readily secured, which for some purposes insures greater accuracy and simplicity in the work than the methods now in use.

The elimination of the many features of uncertainty which are necessarily brought about by the complications of using similar plates heretofore will be readily appreciated by those who have had any experience in this branch of colour photography. Anyone possessing sufficient skill to make negatives and black and white slides, can now secure their results in colours of nature.



SUNSET.

Duple Half Tone, the Tint with Metzograph Second Printing, by Garratt & Atkinson

Photograph by E. H. Atkinson.

SET No. 1. WET COLLODION.

(See article by A. V Kenah)







From Collodio-Chloridl (Aristo) Print



From Gelatine P O P. Print

Blocks by
The Meisenbach Co Ltd

SET No. 2. COLLODION EMULSION.

(See article by A V Kenah)







From Collodio-Chloride (Aristo) Print



From Gelatine P O P Print

Blocks by
The Meisenbach Co Ltd

SET No. 3. DRY PLATE.

(See article by A V Kenah)



From Carbon Print



From Platino Print



From Collodio-Chloride (Aristo) Print



From Gelatine P O P. Print

Blocks by
The Meisenbach Co., Ltd.

THE ARTIST AND THE HALF-TONE MAN.

By A. V. KENAH, A.C.A.



A QUIET LANE

Block by BERSHET & LADYMAN

Photograph by MARTIN J. RIDLEY.

THE title of this article has been selected for me by the Editor himself, who has kindly written me that he feels sure I should be able to write something of general interest to the readers of the YEAR BOOK thereon. Now, however flattering this may be to my vanity, I cannot help feeling that it is a subject that is very difficult to tackle successfully within the confines of a short article, and one which is so much a question of personal opinion that there are some who may read it and will be sure to disagree with my remarks; so I cannot do better than beg these excellent folk to accept my apologies herewith, and to merely regard the expression of my sentiments as stated herein as those of one who is by no means a specialist in process work, and who only treats the subject from an artistic standpoint. When I was recently in Moscow I took the opportunity of paying a visit to the famous Trétiakoff Gallery; I was much pleased to find that a catalogue illustrated with some half-tone pictures, was procurable for the reasonable sum of forty copecks, and at once became the possessor of a copy.

Now, that catalogue was one of the most convenient I have ever handled, and the blocks themselves, so far as I am a judge in such matters, were quite up to the average of similar work in this country. But, when one came to compare the reproduction with the original, the great deficiencies of the process as a medium of translating the artist's work were only too sadly apparent. Take, for instance, the well-known picture by Flavitsky representing the drowning of the Princess Tarakanoff in her prison during an inundation of the river Neva; the whole wonderful light effect on the unfortunate prisoner's face, as well as the clever atmospheric effect in the prison itself, is completely lost in the half-tone picture. I could easily instance other examples in this gallery, but it would be a mere reiteration; and yet I do not think that the higher-class Russian process work is much behind that of other countries. The Russians themselves are decidedly artistic, and one can go into any of the principal galleries in St. Petersburg or Moscow and always be sure of seeing young men copying the pictures hung therein in a most highly creditable manner.

Let us, however, go to that recognised home of art—Italy—and I cannot say that we shall find things much better. Take for examples the half-tone pictures at the end of the catalogue of the Quinta Esposizione Internazionale D'Arte, and turn to page 62, where we shall find a reproduction of a striking piece of work by De la Gandara Antonio, entitled "Ritratto della Signorina R. Salvator." I remember being very much struck by this powerful piece of

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work; the colouring was exceedingly well harmonized; the dress was a black one; the flesh a delicate pink; the hat grey with a white feather; the background consisted of a neutral green curtain; while the lady herself was seated on a sofa upholstered with a lighter green material than that of the curtain, and a glow was imparted to the whole picture by the floor being painted a warm grey colour.

Here, indeed, was a subtle colour effect, combined with exquisite technical skill in the drawing of the figure; and, though the lighting was exceedingly bold for a full-length portrait, nevertheless the artist had retained a transparency even in the deepest shadows.

The half-tone reproduction totally fails to convey any idea of the beauty of this picture; the relative values of even the different colours are not correctly represented, while the engraving as a whole only impresses one with a hard cold effect

Now, it is doubtless unfair of me to take such a stern view of this method of illustration; but, remember, I am only treating it from an artistic point of view The translation of colour into monochrome must, of necessity, always be to the disadvantage of the latter; but at least modern photography has placed in our hands the means of correctly reproducing colour values, and I think it is a pity that more advantage is not taken of the orthochromatic plate.

Again, the reduction in size, which invariably accompanies half-tone impressions, has also much to account for an unfavourable opinion being formed of these reproductions, as the size of the original picture guides, to a great extent, its treatment by the artist.

But the main point, in my opinion, is the great loss of "tone" which is generally so apparent. It is as though the soul of the painting had been squeezed out by the lined screen, leaving only a bloodless body. The very regularity of the grain is often irritating, and is especially noticeable in large even surfaces. As regards this, however, great advances seem to have been made with the metzograph screens of Mr. Wheeler; and I hope to see these come into much more general use. They certainly, in my opinion, produce far more artistic results than their more regularly ruled brothers, and are being largely adopted on the Continent. For such purposes as the illustration of a trade catalogue they would, doubtless, not be so good as an ordinary half-tone screen, but for most classes of art work they are decidedly more effective.

Accompanying this article is a set of pictures which may prove to be somewhat interesting. The photograph was taken by myself in a studio on a Seed plate, and four separate prints struck from the negative in the single transfer carbon, collodion-chloride (Aristo), platinotype and P.O.P. processes. Half-tone blocks were then made by the Meisenbach Co.* from these prints, using the wet collodion, the collodion emulsion and the dry plate methods.

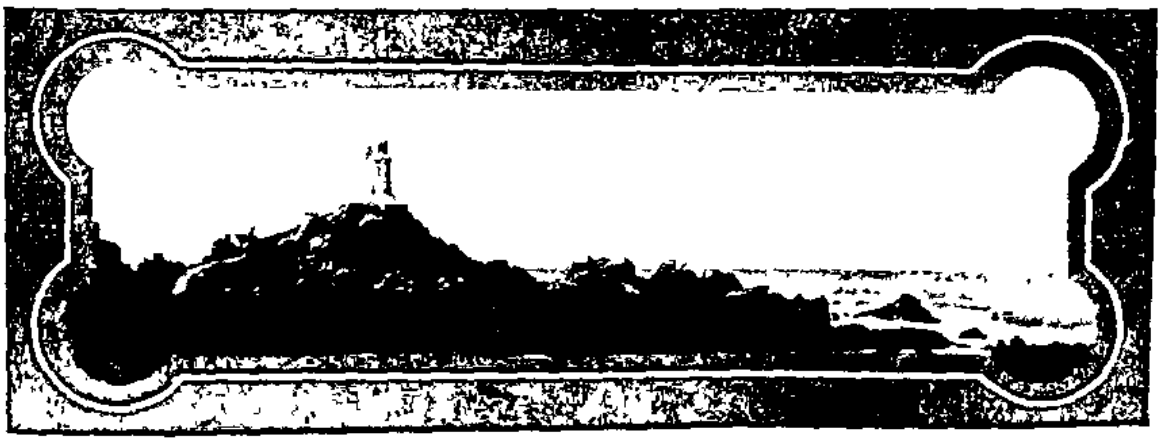
* Mr. Chas. R. Fogwell, secretary of the Meisenbach Co., Ltd, writes:—"A point which might be noted is that three negatives only were made, but that the four subjects were made together on the one negative. It would, of course, be possible had each print been made separately by each process, to have got a far better result from some of them, notably the carbon, which requires, as you know, a very much longer exposure than the P.O.P. A further point which might be noted is that the dry plate gives the best all-round average. As you are no doubt well aware there is generally a considerable difficulty in reproducing carbon prints, and although I am not sure that I am correct, I advance it as a theory that the infinite trouble of getting shadow detail is owing to the refraction of light from the minute particles of pigmented bichromate, and this causes a certain amount of luminosity which cannot be overcome satisfactorily even by a prolonged exposure, in fact, the only way I have ever found it possible to get a good reproduction of a carbon print is to photograph it isochromatically in subdued daylight."

In my opinion, of the original prints, the carbon is, from an artistic point, a long way the best and the P.O.P. the least preferable; while judging from the half-tone results, this is precisely reversed; it is also interesting to note that the wet plate process does not seem suitable for the reproduction of the carbon print, while there is very little difference between the results as regards this, when using either the collodion emulsion or dry plate methods.

The reproductions, except in the case of the carbon print, are highly creditable, as the original tones, which were purposely made on a steep grade, are well preserved, but it is only fair to add that the half-tone blocks in this admirable publication are of a very high-class character, and represent the best work obtainable, while my previous criticisms allude particularly to the ordinary everyday blocks on which, naturally, for many reasons, so much care cannot be expended.

I do not wish it to be understood from the foregoing remarks, that I am at all hostile in my feelings to the half-tone screen; on the contrary, I regard it as one of the greatest benefits of modern times. It places at our disposal a means of rapidly and effectively reproducing every kind of illustration at a cost which at once places it in front of any other method; and, in the hands of the highest class of workers, and under favourable working conditions, it would indeed be unjust to accord to its achievements anything but the highest praise.

As a means, however, of reproducing art subjects to the utmost degree of perfection, it cannot, nor indeed do its best friends pretend that it will, compete with such a process as photogravure. The two methods are in no way on the same plane; and, while we may indeed revel in such an artistic treat as the recent publication of "The Great Masters" by Mr. William Heinemann, and go into raptures over the splendid reproductions contained therein of Francesco Francia's "The Deposition," or of Ruben's Altar-piece of the St. Ildefonso Chapel, we must not forget that these are of a totally different class from that of ordinary half-tone work. There are many enthusiasts, though, of this process who allow their zeal and devotion to carry them somewhat too far; and who, consequently, do their favourite no good thereby. To these I would commend the wise words of the great Sir Joshua Reynolds, delivered in an address to the students of the Royal Academy on December 10th, 1772:—"That which is most worthy of esteem in its allotted sphere, becomes an object, not of respect, but of derision, when it is forced into a higher, to which it is not suited."



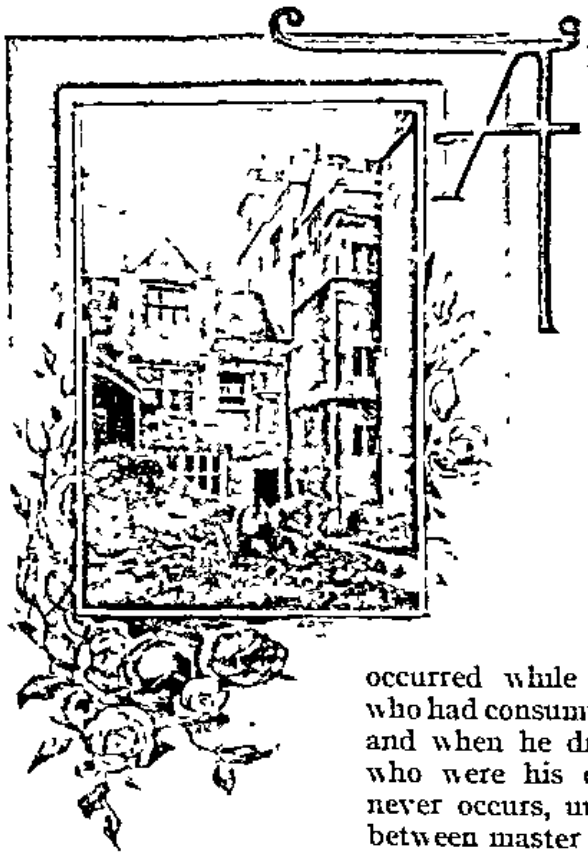
"Dawn"—Corbière Lighthouse, Jersey.

Half Tone by
Gilchrist Bros.

Photograph by
C. S. Best

PROCESS IN AMERICA.

By EDWARD WINDSOR, Kansas City, U.S.A.



BORWICK HALL

Design and Block by
LASCELLES & Co., LTD

Photograph by
GODFREY BINGLEY.

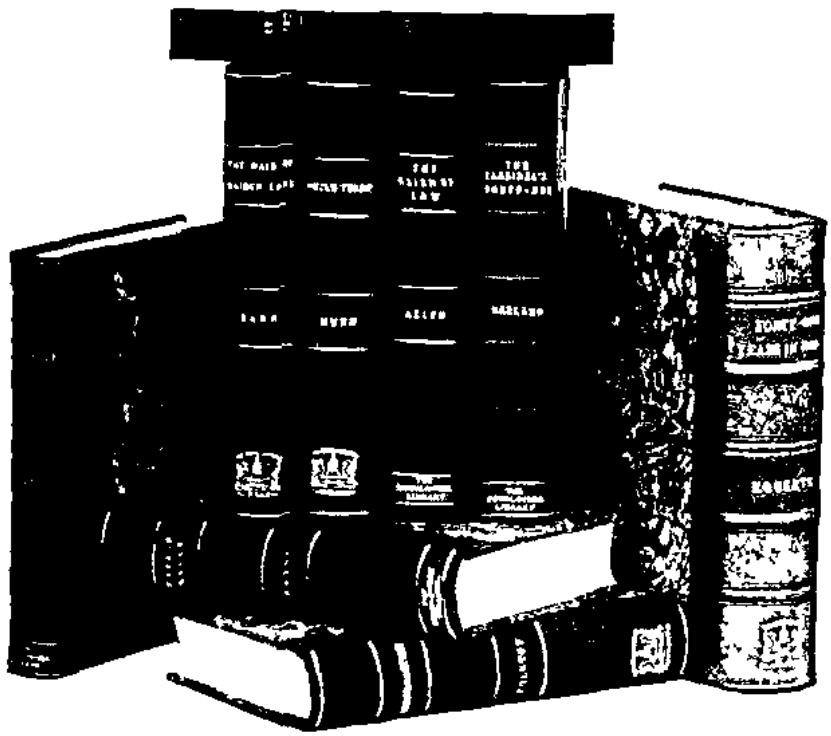
AMERICA is a great country for our business; good men are wanted, and can find employment almost anywhere at a good salary, in many instances one can find men who have been with one firm from 15 to 20 years, almost from the birth of the half-tone process. Labour and capital are organized in this country, much to the benefit of both master and man

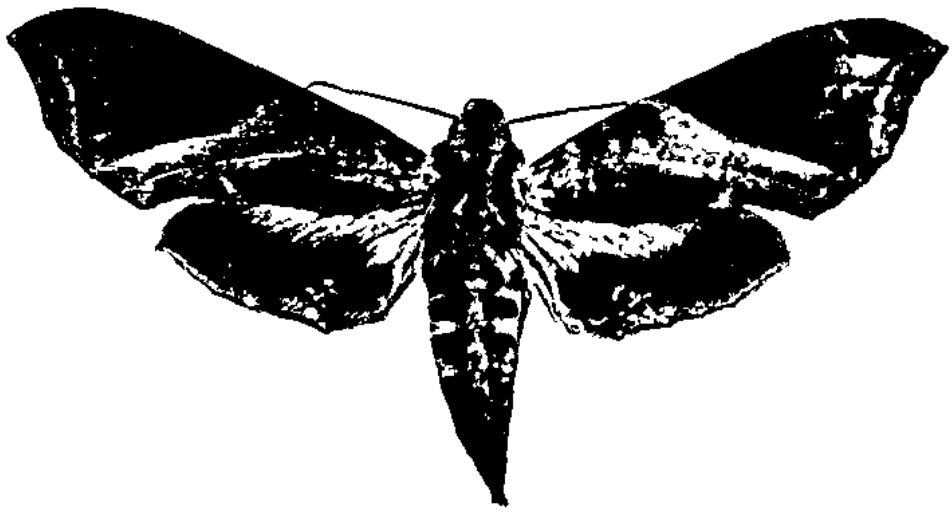
The employés have a union which is recognised by the employers, and is becoming one of the strongest and best organized unions in the country. The standard scale of wages, which varies in different cities according to the cost of living, protects the employés. If a man should fall ill or die, his fellow-workmen look after him. A case occurred while I was in Denver, in which a finisher, who had consumption, was kept and cared for for months, and when he died was buried by his fellow-workmen, who were his only friends and mourners A strike never occurs, until every possible effort at agreement between master and man is made. The masters have an association by which they are pledged to keep up the prices.

The work is skilled labour, and the required skill takes a man years to acquire and brains to properly accomplish. Why should we sacrifice our dignity and comfort by cutting down the prices until the game is hardly worth the candle?

The chief difference between English and American methods is that while most English firms use the prism and make and etch the prints separately, lining and sizing up on the plate, the majority of American firms make the negative without the prism, coat with rubber and collodion, cut the film to size, strip and reverse about half dozen ordinary sized jobs on to one glass, printing and flat etching on to one piece of metal, and then cutting up for the fine etchers. They claim that a sharper negative can be obtained without the prism. Line work is treated in the same way, which saves the waste and time taken by the old-fashioned method of soldering together.

One thing which impresses the stranger is the enormous distances one has to travel from one city to another, and their size and prosperity. A striking feature of the American cities is the numerous parks and tree-lined streets, and the good nature of the people. Washington, Detroit and Denver are among the prettiest cities I have been in. The former, "The City Beautiful," is noted for its historic interest and magnificent buildings and statues, and the latter for its splendid climate; it is called the "City of Lights," and "The gateway of the West." From it one can see nearly 300 miles of the grand old mountains, and it is just one mile above the level of the sea.





REALISTIC COLOUR WORK.

Reproduced direct from the Articles.
in Three Printings, by the
Electro-Tint Engraving Company, Philadelphia U S A

Printed from
Electrotypes

THE PRESENT ASPECT OF THREE-COLOUR PHOTOGRAPHY.

By EDWARD F. GRUN, L.R.C.P. (Lond.).

THE general interest which was taken in the article on three-colour photography, which was sent for the 1903-4 volume of PENROSE'S ANNUAL, renders another contribution a work of great pleasure. It has also acted as a stimulus during the year for obtaining something that should be worth the traditions of the Annual. It is hoped that the efforts in this direction will be considered a success. In placing before the readers of this Annual an actual representation of a stage scene, displaying the true effects of the stage manager's conception in light and colour, I trust that it will be admitted that a real advance has been made. It is not easy to judge of the merits of personal productions, but those most interested have described the result obtained as both true to nature and pleasing in effect. With regard to the general outlook of three-colour photography at the present moment, we may describe it as most hopeful. Those who were fortunate enough to see, on Nov. 10th, 1903, at the London Camera Club, the beautiful and artistic results obtained by Sir William Abney, during his summer visit to Switzerland and the Riviera, could not (in spite of the obvious reluctance and conservative hesitancy of certain ancient critics)—could not, I say, avoid giving that tribute of admiration, which they would have been only too glad to withhold. All must now be convinced that three-colour photography is *un fait accompli*, and is capable of reproducing nature in her most delicate and fitful moments, and Turner himself would have looked with envy upon Sir William Abney's beautiful masterpieces. As Sir William remarked to the members of the Camera Club, "No doubt you all take three-colour photographs, but I very seldom see the results." Therein lies the crux. Before us is constantly the question how three monochrome negatives are to be translated into colour results. The colour values are there, and with the aid of the projection lanterns can be made apparent, but for the general public another method is essential. At present, the only method available is the half-tone process-block method. This, when carried out by expert block makers, leaves nothing to be desired. The film diapositive method is not, in the opinion of most judges, either pleasing or satisfactory. The collotype process is also very difficult and unreliable, and is not likely ever to become a convenient method for the professional or amateur photographer to adopt. Of all methods of reproducing colour values, the gum bichromate appears to be the most promising, and with suitable paper and pigments will be that most in demand for general use. The results obtained with gum bichromate are very promising, and in a very short time no doubt satisfactory three-colour pictures in gum bichromate will be forthcoming. The question of screens for three-colour work is becoming now much simpler. The colour values of the screens appear to have been, so far, somewhat misunderstood and the screens, which enable reproductions of most accuracy to be made, are what Dr. Miethe describes as "the Subtractive Screen." For reproduction by the half-tone block process, where the positive print is made in the colour complementary to the screen, it is essential that the negative should record all the colours except the colour which the positive will be printed in. Therefore the red screen must record red and yellow and be minus blue. The green screen must be minus red, and the blue screen minus

yellow. This implies that the blue screen must record red. Now as all existing blue screens allow so much blue to pass that all the red is swamped by the excess of blue, it is really necessary to use *two* red screens, one red screen passing red and yellow, the other red and a slight amount of blue, giving a mauve pink screen. The exposures for the red and blue screens then become approximately the same, and if an extra red sensitive plate is used, such as a "Lumière B," the exposure in good light becomes approximately at *f*/5 20 seconds for red, 6 seconds for green (one special green sensitive plate being used) and 20 seconds for the blue screen.

It will be seen that this implies a much longer exposure for the blue, but the density of the screens may be considerably reduced if suitable plates are used, and practically 10 seconds may be given for red and blue, and the "Lumière B" plate is not very sensitive to yellow, and therefore a lighter red screen may be made use of. With regard to the form of lens to be used for three-colour work, a great deal depends upon the class of work it is intended to reproduce. For pictures and objects on one plane, no doubt a highly corrected astigmatic lens will give the best results, but for natural objects or portraits, pleasing results of artistic value can only be obtained by a very large aperture lens. Personally, I find the Liquid Lens of my own invention answers all the requirements. If I did not use the Liquid Lens, I would use the Dallmeyer 2 B. It is a matter of common experience that the modern anastigmatic lenses, with all their wonderful corrections and flatness of field, are most unsuited for portraiture or artistic work, and it has never been my experience to see in a professional studio an anastigmatic lens in use. The extremely minute definition produced by the anastigmat, is not natural, and is not the image that the eye is accustomed to deal with, any more than the picture of the galloping horse, as taken with the focal plane shutter, is what the eye recognises as a galloping horse. The artist painter is most studious in suppressing unnecessary detail in pictorial work, and for colour-photography to become pictorial, it is more important still that detail should be suppressed. A great many of the results of three-colour work are most displeasing to the eye, simply on account of their excessive detail.

The original portrait lens of Petzval has held its own now for some fifty years, and for the special purpose for which it was designed, appears difficult to excel.

By introducing minor corrections and bringing the glasses into optical contact, increased covering power is obtained and increased intensity, but some roundness of field and some spherical aberration must remain to give the necessary softness and depth of definition. Owing to reflection and absorption, the anastigmat is disproportionally slow in action, and, after all, the most important point for a very great many purposes is rapidity. In this respect the Liquid Lens is considerably in advance of all other lenses, and for purposes, other than three-colour photography, Liquid Lenses made with solid combinations of pure quartz are of the highest possible degree of light intensity, and can be obtained at a comparatively moderate cost.

During the current year, in conjunction with Mr. Albert Smith, of Southwick, I have been directing my efforts towards producing a simplified method of translating the three-colour negative record with a positive colour record, and I am happy to say that it is now possible to produce a result in a far more simple manner than has been hitherto available. The principle of this method lies in the fact that the gelatine surface of the ordinary lantern slide, bromide opal or bromide paper is capable of receiving three printings in successive colours. Briefly, the method is as follows: To those who have made a study of the Sanger-Shepherd process, the details will be quite easy to follow. In the

first place, a blue-toned base is made which may be lantern slide opal plate or paper. This blue-toned base is then sensitized with bichromate solutions, dried and printed under the green screen negative in the ordinary way. The excess of colour is removed by washing in cold water after the Jumeaux-Davidson method, leaving the gelatine intact upon the plate This plate is now resensitized with bichromate, and a third printing under the minus-yellow screen negative gives the complete result in perfect colour value, this doing away entirely with the necessity of superimposing successive layers of films. For lantern-slide production this method gives absolutely perfect results For portraiture upon opal plates the method gives results occasionally uncertain, but in about 25 per cent perfect; by adopting a ferrocyanide sensitized opal plate the proportion of successful results is much greater, and probably a little further experimenting will result in quite certain results The difficulty at present is to get a reliable blue The red and yellow printing present no obstacles Any photographer trying this method will find that, provided the exposure of the bichromatized blue print is not carried too far, and with a recently sensitized print the exposure in good sunlight is not much more than five minutes, the result with red staining is most accurate The subsequent printing for the yellow staining must be very brief, as the effect of the bichromate and the exposure to the same is inclined to degrade the red, but if sufficient care is used this can be avoided



Scene from Princess Ida
Taken during ordinary performance at the Brighton Theatre Royal
½-sec exposure with Grün Liquid Lens



GREAT EXPECTATIONS.

Three Colour Blocks by
Hood & Co Limited

From an old
Coloured Engraving.

REMINISCENCES OF LITHOGRAPHY AND PROCESS AT THE ANTIPODES.

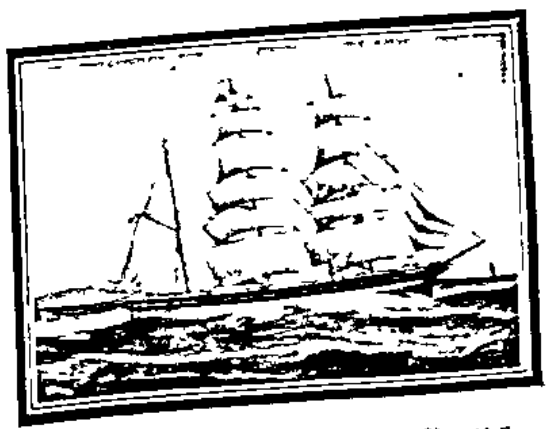
By FREDERICK SEARS.



FREDERICK SEARS.

LITHOGRAPHY as a profession is a most fascinating one, from the time when the apprentice makes his first transfer from which he anxiously takes his first impression to the time when he is able to master it in all its intricacies and details and show, with pride proofs of beautiful chromo lithographs, dainty commercial letter headings, note heads, business cards, etc., which he has turned out to the satisfaction of the artist, his employer, and the general public alike.

It has been the lot of the present writer to reside in and visit many distant parts of the world, and meet various types of the genus Lithographer, and one which he will always remember was Sandy Campbell, who in the year 1883 was employed printing on the only hand press in Freemantle, Western Australia. Sandy, in his early youth had broken the laws of his country and was transported to penal servitude for life, but, by good conduct and the fact of his not being able to escape from so closely guarded a penal settlement, was released on a ticket-of-leave. Sandy went to the North-West pearl fisheries and was the finder of that beautiful pearl which is a perfect cross and which is valued to-day at £6000, but poor Sandy was too fond of the "wee drappie" and gave it away for a bottle of rum. I heard, when in Western Australia eighteen months ago, that he died some years since penniless and forsaken, but what I shall always remember him by is a little job he once did for me. I was at that time an officer in the W.A. Government Survey Dept., and was asked to design and draw a letter head for a friend of mine who had been sent to W. A. for the good of his country, and under the point of the bayonet.



MY FIRST OCEAN HOME—THE BARQUE "LETTERWE."

Drawing by Frederick Sears.

Being quite satisfied as to Sandy's ability by the large firms he said he had worked for in England, I engraved the letter head on stone and sent it to him to get me a proof. The next day Sandy's boss sent for me, and, to my amazement I found him struggling to get a proof of the stone he had gummed up, and when I told him he should have inked it in instead of gumming it

have sprung up and work has left the lithographer for the process block man. To be sure there are difficulties to be overcome, but that is what the brainy lithographer is here for.

Since my arrival in England I have met many half-tone process block engravers and they all declare that half-tone by lithography is no good, too flat, etc, etc. Who would expect them to say otherwise? But they are all wrong Half-tone blocks from an artistic standpoint are not in it with a lithographed half-tone, when the negative is made so that all the superfluous screening is gone; a print from such a negative, from zinc, aluminium, or stone, is beautifully rich and velvety in the blacks, and the most delicate tones of a pencil drawing or wash are far more faithfully reproduced than by a half-tone block, and there is the great advantage of being able to lithograph on drawing paper, in fact, any paper, where the half-tone block, to give even a passable result must be printed on a highly coated paper, which in itself is most inartistic, and shows the screen (which is an eyesore) to perfection

Lithography has its day to come with the mechanical processes, and half-tone blocks will be relegated to their proper place What a vast amount of business has the chromo lithographer lost since the introduction of the three-colour process and how much is still wanted to make that process perfect! Still, with the negatives made for lithography, and an addition of two or three printings, what much finer results could be obtained than at present. And a printing or two is neither here nor there if the result justifies it. I have no doubt whatever that three-colour by lithography, with an additional printing or so, is the coming process and every lithographer should work to that end, and try to get a little of his own back.



A Corner in the Studio of the Sears Engraving Company, Berhampore, Wellington, New Zealand



sub-divided into two rooms, the foundry having a room devoted to the dynam
tubs, washing and coating of moulds, taking off and rinsing shells, while
moulding and its consequent branches, filling cases, blackleading moulds
backing up, are carried on in a room by themselves In the finishing depar
all finishing, machining and metal body work should be carried on in one
all wood blocking and trimming in its own room, where the shavings and
can be conveyed to separators, where it is freed of its metal before bein
or carted away. By such an arrangement each room may be kept
clean

In New York it is the general practice, with the exception o
plants, to bunch the entire plant in one large room, and we usual
a general conglomeration Such being the custom those plants
laid out in this city have been in conformity

As the moulding press is the pivotal point of the establish
take it into consideration first, although we may not actually be
plan from this point The arrangement of the presses is importa
to the make-up or imposing stones, the form racks and
pulations of the mould should follow regularly in its removal f
The greatest number of steps and the longest carries should
helpers, as their time is less valuable than the moulder's.
be lined along one side of the room if possible, in front of the
make-up stones built in bench-form between them and the
passage-way three feet wide between. The form racks, which
both sides, should stand at the opposite side or directly beh
behind each press, having sections for live and dead forms
allows the helpers to take out or put in forms without getti
moulders. The wax kettles may be conveniently located at
the line of presses, out of the way, but the cabinet for keep
should be as near and as central to all the presses as possible.
should stand beside or close to the filling table, avoiding long
waxman until he has finished his work, placing the mould in the heat
or, as the boys call it, the "hot-box." Reference to the first illustrati
about the lay-out referred to, as well as the handling of the work up to the
up. A continuation of the moulder's bench accommodates the men trim
down and building the moulds. Directly behind them stand the leading machin
while in front of these machines stands the bench for stopping out the moulds.
A step to one side of this bench stands the rack to receive the moulds which are
ready for the battery man. Only one step for this man, and he places the mould
directly in his tank for washing out, while his coating tank is at his other hand.
He must now take eight steps to a point central to his four tubs.

Laying out the plating part of the plant needs the most careful attention, not alone the dynamo and tubs as to their convenience to the washing and coating sinks, but the sinks and their piping. The soil pipe which empties the coating tank is the most annoying condition in the entire plant, unless it is made of some form of tile or material that is unoxidizable and can be carried in nearly a perpendicularly straight line, with adequate clean-outs at every turn. Before the waste from the coating tank is allowed to enter this pipe, it should be passed through a trough having compartments opening alternately at the top and bottom, so that the direct current of water is broken by passing over and under the partitions. In this way the refuse iron oxide, which results from the coating of our moulds and which is so troublesome in clogging soil pipes, settles in this trap, from which it may be removed at regular times. The batteryman needs a wide passage

way between his tubs; when I can spare the room I allow four feet. He also needs a sink and a kettle for heating water for taking off his shells. These are placed in line with the coating and washing out sinks. As he only needs hot lye for rinsing the wax from his shells, and as the pan washer uses it to remove the kerosene after scouring the casts, it can be placed to better advantage nearer the furnace. The dynamos should be placed in line with the tubs and to one end of them opposite the coating and washing sinks. The second illustration shows the tubs, dynamo and sinks.

Passing on to the backer-up. It may be necessary owing to conditions of the building to make a separation between the battery and the furnace, but if



2 The Depositing Plant

conditions permit it will be advantageous to place these branches as near together as possible. Have plenty of light and air. Another important factor is to have the coal and wood handy. The coal box particularly should be within reach of the furnace, it would be very convenient if the man could shovel directly from the box into the furnace door. Have a box which will hold one ton and on wheels. The arrangement of the furnace should be so planned that the backing pans can be all on one side, while the necessary apparatus for solid body work can be arranged along the other. It is a very wise plan to put a metal canopy over the furnace and pans, to which is connected a large exhauster to carry the excessive heat and fumes outside. The third illustration will show the arrangement of the furnace, pans, water and lye kettles, sink and so forth.

It will be seen that the backer and his helper have very few steps to take in the pursuance of their work Directly in front of the furnace stands the backer's rack for flowing the shells with acid and his stand or bench for laying on the foil. Next is the pan-washer's bench for chiselling and picking out the metal Beyond is his kerosene trough and sawdust box Behind him are the water and lye kettles, the sink and the pickling trough. It will be noted that the work has progressed through each manipulation in the foundry in regular succession, that it has not been carried back and forth and that the longest carries have been made by the boys and helpers.

In laying out the finishing room, or, if the entire plant is to be bunched in



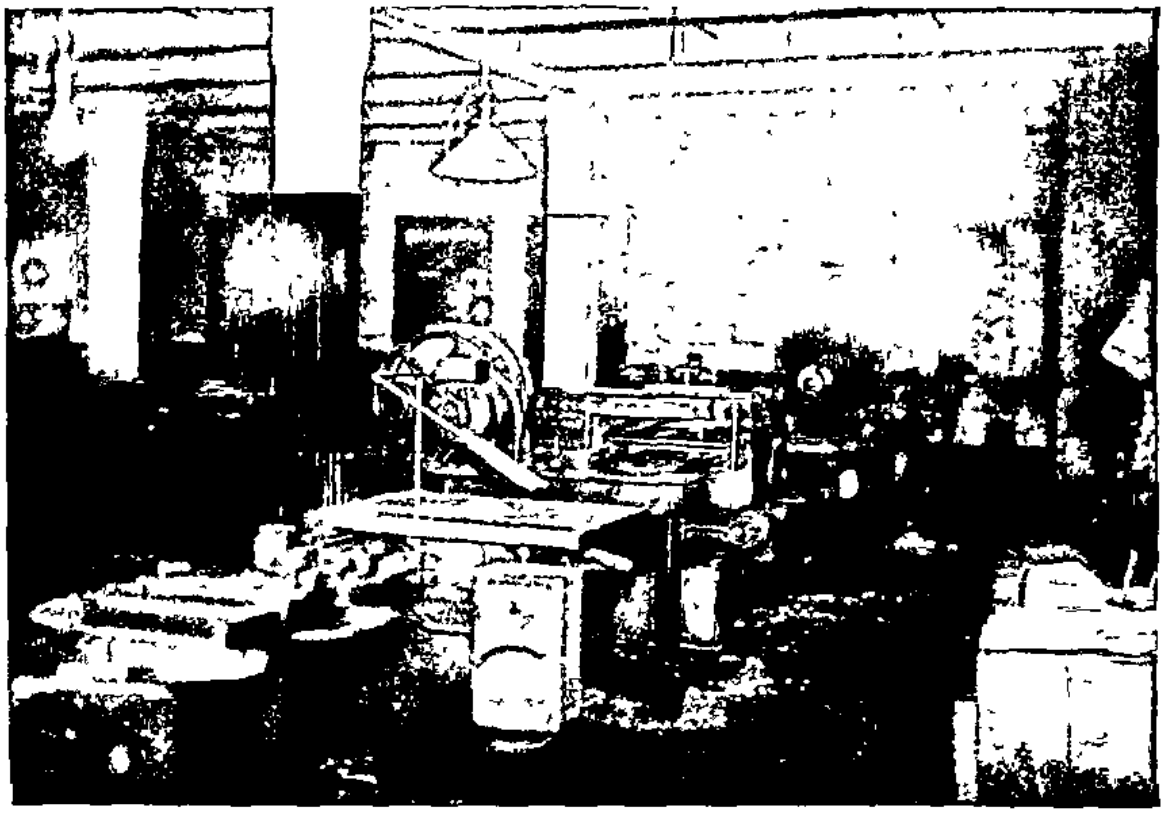
3. The Foundry.

one room, the finishing end, there are many preliminaries to be gone over and considered before the best and most economical arrangement of machinery and benches can be made. Much depends upon the nature of the business to be carried on—whether it is book and periodical, as connected with a publishing house, jobbing, or both. If only book and periodical, considerable machinery may be dispensed with and the arrangement is more simple and easy. If a general jobbing business, much more machinery is necessary, and the lay-out becomes more complicated and difficult to insure a rapid and economical handling of the work. On one point insist; that is on having the wood-working machinery in a room by itself; the advantage will be fully demonstrated after the plant has been

in operation a short time. If you expect to operate many wood working machines, insist upon having each connected with an exhaust fan for the removal of the saw-dust and shavings to a large can or, better still, a separator, which cleans the metal from the dust from the trimming machines, resulting in quite a saving of metal during the year.

The finishing room needs plenty of light. If you have a room with windows on three sides you are in luck—or if you have them on two it will not be so bad.

The first machine to be placed in the finishing room is the saw for splitting up the casts. This should be as near to the door leading to the foundry as possible. or if the arrangement is in one room it should be placed as convenient to the backing-up operations as possible. The pan washer may not be such a highly



4 The Finishing Shop

paid workman, but he is liable to be very busy and the fewer steps he takes the more work he can turn out. A rack that will hold about twelve (not too many) casts, should be allowed on the foundry side of the saw. Into this rack the casts are placed as they come from the foundry and are all ready for the man working at the saw. This is the starting point for the work in the finishing room, and its position governs that of all the other machines in this room, if the work is to advance step by step in a regular order through the remainder of the process of manufacture up to the point of delivery. Conditions of the room will also have much to do with the arrangement of the balance of the finishing machinery. If conditions will permit, it is good practice to line a number of machines with the saw, this arrangement makes a good appearance and is convenient. Next

to the saw may be placed the large or roughing plough, leaving three feet between. On the other side of the plough the large smooth shaver. Between this machine and the next, which should be the smaller or second plough, leave a passage way five feet wide. Directly in front of these machines place a strong bench upon which to lay out the work as it is roughed and split up into the different jobs On this bench too, the ploughman may have an iron slab for straightening the plates before roughing, or taking off the first cut. Following down the line, on the other side of the second plough comes the second or small book shaver Then comes the second saw for ripping off the guard lines before putting on the bevels. Next the bevelling machine. In front of these machines should be placed a second bench for plates which have been straightened and are to be shaved for



5 THE FINISHING SHOP—(Continuation).

the last time, sawed up and bevelled. If conditions of the room will permit, that is, if the windows come on this side of the room, it will be very convenient to have the benches of the finishers arranged along the wall, leaving a five-foot passage between them and the plate benches already mentioned Otherwise it will be necessary to carry the plates to, and bring them again from, the finishers for the second machining.

The remaining machines may now be provided for as conditions and convenience will permit. A line at right angles to the first is good practice. It may comprise other bevelling machines, special bending machines, trimmers for curved work, a third saw and jig saw. The routing machines call for a well-lighted corner, with windows on two sides if possible. They should be all together



"AT HOME."

Design and Half Tone by
W. & G. Baird, Limited

Prize Photo by
W. McLean, Belfast

and surrounded by either stationary or portable screens ; I have found the latter very convenient for confining the chips to the immediate vicinity of these machines, both for the comfort of the near by workmen and general cleanliness of the shop.

For the handling of solid body work, or work that is to be mounted type high on metal bases, the machines should be as closely together as possible. If the sawing of bodies is to be executed on the same saw as other work, it should be done on the saw on which are sawed the casts or pans as they come from the foundry. Then the trimming machine for bodies should be placed behind this saw and the sweating-on press at one side of this trimming machine. If there are other heated presses, used in connection with curving plates, they may be placed in this group, then all the water and gas connections may be provided at the same place.



6. Chemical Bench.

The benches for the finishers need particular attention. These may be divided into two classes, the jobbers and the book and magazine men. The former may be placed nearer to the blocking room, while the latter should be near or in front of the ploughs and shavers.

In laying out the benches for the finishers, an important factor to be considered for both employer and workmen is individuality among the men, and in fitting up a new finishing room it will be found a good plan to have the benches separated, especially if they run in a line, and the men set side by side, as they would in front of windows. Partitions of light wood should be put up at intervals of three feet along the bench, giving each man ample room at either side of his slab or lock. The partitions should extend out from the bench in front about eighteen inches,

being three feet high above the top of the bench and sloping down to about fifteen inches at the back of the bench, or at the window. The object of this partition is two-fold—besides giving each man an independent booth around his bench, it serves as a support for a light frame, which may be covered with very thin cotton cloth or light cambric to modify the glare of the sunlight, giving the men a pure, strong, soft light on their work These screens will be found much better than a curtain pulling down from the top of the window, not only for the reasons stated, but also that they will not darken the room generally. It will not take the workmen long to appreciate their value to them.

Of vital importance to the electrotyper is the provision of adequate and ample facilities for the proving of all work. There is no remedy that will take the kick out of a printer as quickly and completely as a good proof, and if your work is all right you want evidence that will establish the fact beyond the possibility of a doubt A spot should be selected as much removed from trimming machines, saws or machines which make much dirt or dust You need also a cabinet in which you can keep both roller and ink closed up away from the air. Provision should be made near to the press for racking the book-plates preparatory to proving, the final boxing and delivery A bench may be provided near or at this point for the assembly, checking and delivery of the job work as well.

As the last, but not the least, feature of the model equipment should be provided the foundry office, where the accounts and other clerical work connected with the manufacturing may be done This room should be partitioned off from the other rooms and all the noise possible excluded. Ample desk and closet room should be provided for keeping the necessary books and files, and the smaller miscellaneous supplies used in the shop. The rank and file of the workmen should not have free access to this office, being allowed instead communication through a swinging pane of glass in one of the windows.

The different photographs will illustrate a plant which has recently been laid out on the general lines laid down in the foregoing article, the last three pictures showing the different portions of the finishing end of the business, together with the writer's bench for small chemical manipulations.



Off the Jersey Coast

Block by
Gilchrist Bros

Photograph by
C S Best

ARRANGEMENT OF SCREENS FOR MULTI-COLOUR WORK.

By MAX LEVY, Philadelphia.



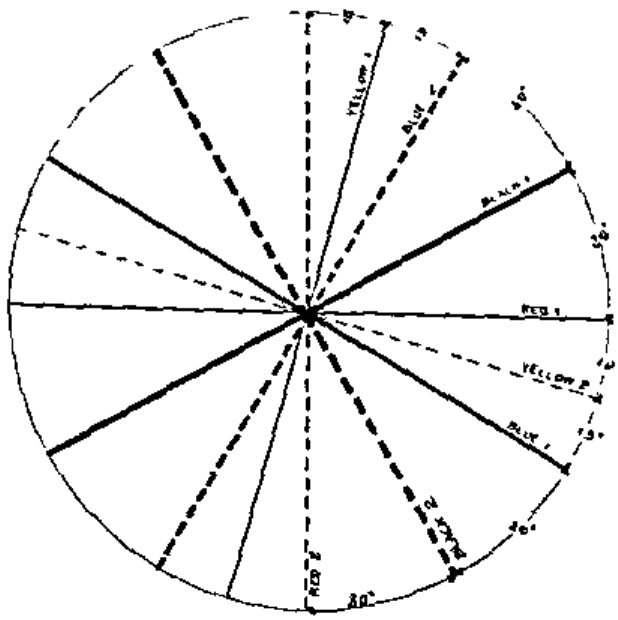
Block by BOURNE & Co Design by W. GILLIARD

IN the early days of the half-tone process it was very common to see work printed with the lines in horizontal and perpendicular directions, most frequently with the horizontal lines predominating in point of strength. The reason for a universal change to a diagonal line, and an equal diagonal line in two directions, is probably to be found in a defect almost universal in the human eye, but, of course, varying from being almost imperceptible to a very serious impairment of the sight. I refer to the fault of astigmatism. Nearly all eyes are more or less astigmatic, and in the majority of cases lines approximating the horizontal are more clearly perceptible to the observer than those approximating the perpendicular, but certainly the very great majority of cases are those in which either horizontal or perpendicular lines (or directions approximating these) are more clearly visible than lines in other directions. In my own case, the departure from horizontal and vertical lines to diagonal lines was due principally to a recognition of this condition, and I believe that the same cause was quite general in its operation. Dealing with lines in only two directions the remedy was quite simple, and before any considerable requirements arose for printings with the lines in more than two directions, the use of the diagonal line had become quite settled and fixed, and it followed that upon this practice the arrangement for any additional printings was based.

The next step in the process was the production of plates for printing in two colours, or what is frequently called duotype, and it was perfectly natural in proceeding with such a piece of work to obtain the greatest variation in the direction of the lines for the two colour plates, and as experience had demonstrated the general preference for the diagonal directions, these directions were employed for the stronger or predominating colour, and the horizontal and vertical directions for the subsidiary colours. When we come to three-colour work the situation becomes more complex, and several years elapsed before any definite arrangement came to be generally accepted. In much of the earlier work the separate blocks for each colour were made with the lines in both directions of equal prominence, and on this basis it was possible to use the blue printing block, which gives most of the detail and character to the print, with the lines running in either the diagonal or the horizontal and perpendicular directions, and many of the earlier workers along these lines preferred to use this block in the latter manner. I presume, however, that the same condition which governed, or which appears to have governed, the direction of the lines in the plain half-tone came into play, and in the latter stages of the work, on the basis I have mentioned

above, most of the screens were ordered in such a way as would produce the blue printing block with diagonal lines. This practice was changed by the general adoption of the method in current use to-day of making one line in each block strongly predominating, and even in this case the common practice to-day is to use the blue printing block with these lines (one more prominent than the other) in a direction of forty-five degrees to the base of the plate—and this is probably on the whole, the most satisfactory combination. Latterly, it has appeared desirable to add a fourth colour, a black or deep grey, and I have frequently been asked my opinion as to the best screen arrangement in such a case If the four plates are arranged with their lines divided symmetrically around a centre, it will form sixteen angles of twenty-two and a half degrees each, and with strong colours this acute angle of crossing forms a rather bold figure, with great danger of moirée with the least variation. It is better, therefore, to still further reduce the angle between the red and yellow, even to fifteen degrees, so as to retain the thirty-degree angle between the two stronger colours, the blue and the black or other strong colour employed to give body and character to the print To fully apply this arrangement to the best advantage—blue, red and body print (block, if you please) at thirty-degree angles, and the yellow at fifteen degrees to the red and blue.

Below I give a diagram of this arrangement worked out in accordance with the experience outlined in my early remarks —



This diagram is based on a predominating line in each block, and it will be seen that this gives the base of the picture, or horizontal direction for the prominent line in the red block. I have indicated the colours by lines of different thickness, the predominating line in each block by a solid line, and the subsidiary line by a dotted one.

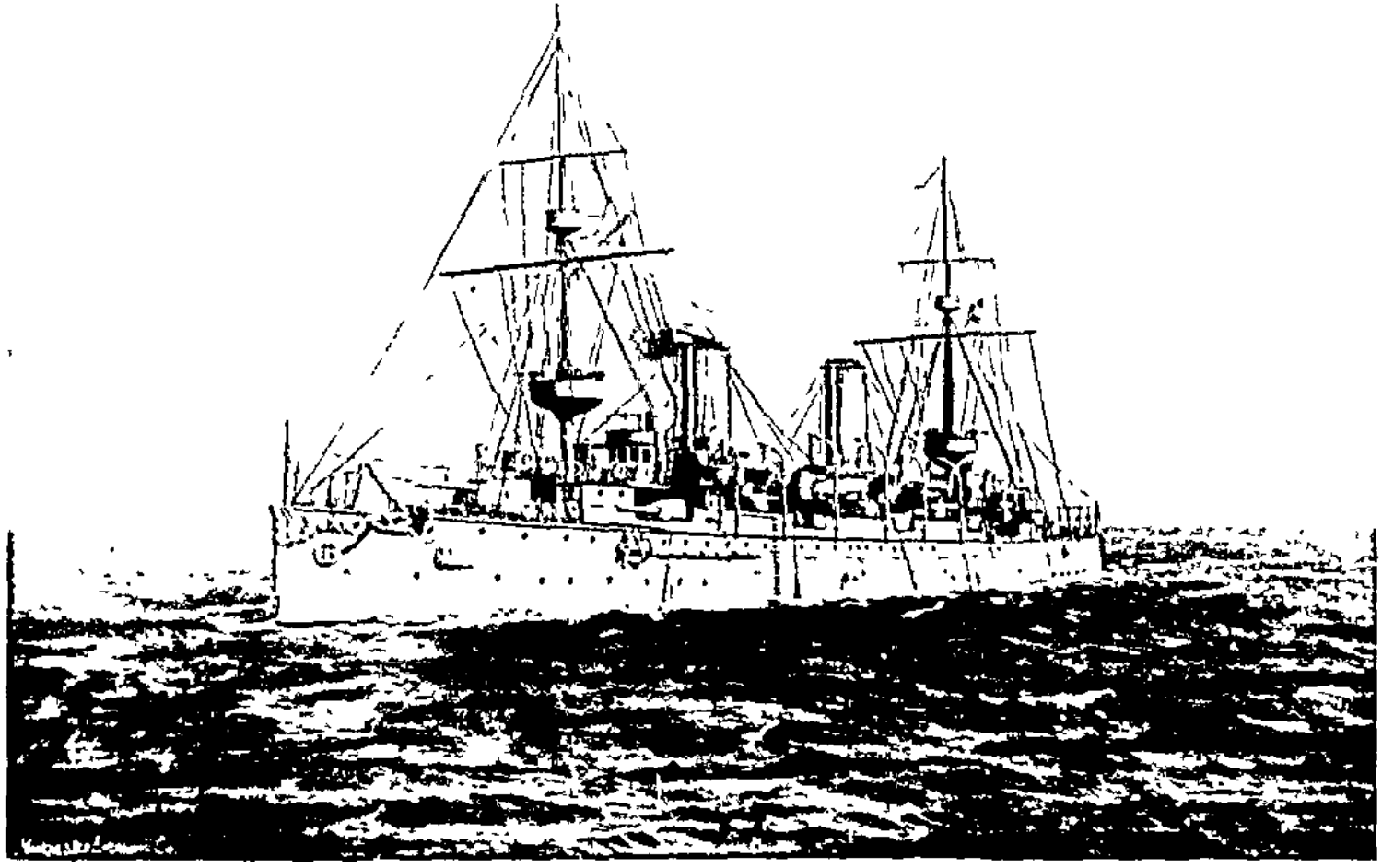
The most satisfactory way to obtain these effects is to have a circular screen properly mounted so that the different angles may be readily secured with precision. I might also add in this connection that more satisfactory work will be produced if the lines in the screen itself are of different thickness, than if entire reliance is placed upon the use of elongated stops to obtain preponderance in one of the lines in each plate.



"SUCCESS!"

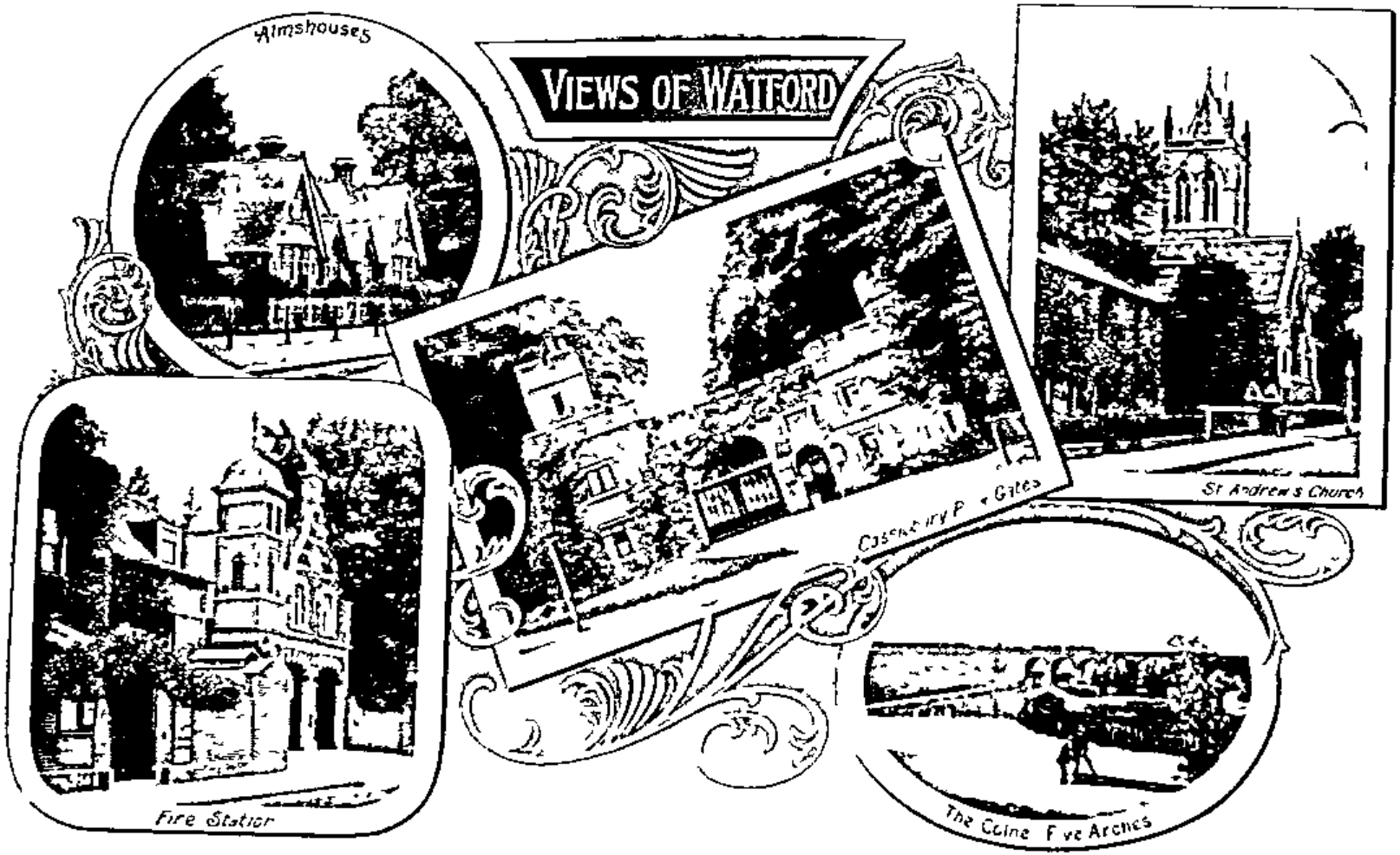
By S. E. Waller.

Three Colour Block by



A MODERN MAN-O'-WAR.

Half Tone by
Manchester Wood Engraving Co Ltd



Photographs Design and Block by
The Acme Tone Engraving Co., Ltd



SPRINGTIME IN SOUTH AFRICA.

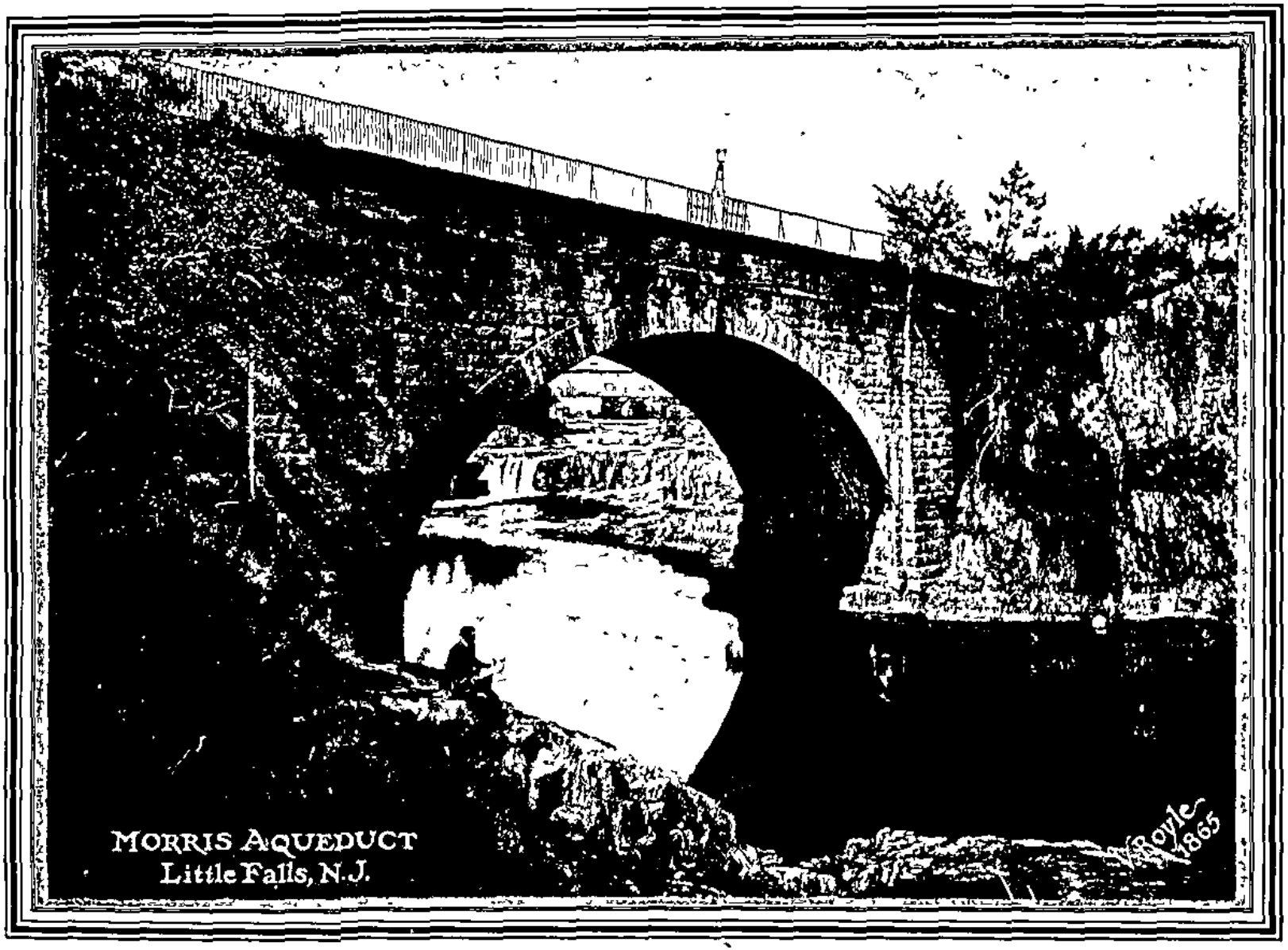
Block on Zinc by
E. J. Akerman
(Gold Medalist, Cape Town Exhibition).

Photo by
Elliott.



ANN HATHAWAY'S COTTAGE.

Blocks by
S. A. Cottell & Co



"With a single arch from ridge to ridge"

400 line Half Tone by

Lined on



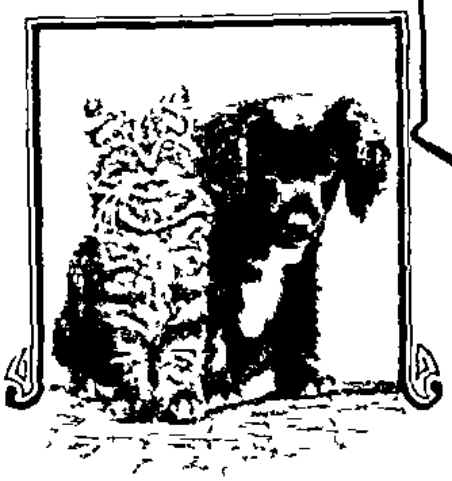
SPECIMEN ILLUSTRATION FROM
MR. ARTHUR RACKHAM'S "RIP VAN WINKLE."

Reproduced by the
"HENTSCHEL COLOURTYPE Process

Published by
WM HEINEMANN.

REVIEW AND FOREVIEW.

By CARL HENTSCHEL.



FRIENDS AGAIN

Block by BURSILL & LADYMAN Photograph by MARTIN J. RIDLEY

THE Editor has asked me for a few notes. I have no time to labour any specific subject. I think, therefore, I will take a theme big enough to give me comfortable room in which to turn round.

"The Past and Future," with incidental Present—we must never quite forget the present!—may serve my turn.

I have been a companion of "the bath" almost from infancy. As to that, any who are kind enough to feel any interest in me can learn all they want to know from the brief narrative published, on 23rd September last by T. P. O'Connor, in his journal, "M.A.P." as one of his series headed "In the Days of My Youth: Chapters of Auto-biography."

My father was an American citizen. He was the inventor of a good many things, including the Gladstone bag, and the paper collar, and he developed some notions for preserving meat; notions, too, for making ivory from the caseine of milk, for photographing and engraving on wood and on glass by various processes, and for making auto-type plates—again by various methods. Indeed, I claim that he was practically the pioneer of process engraving.

Our past had its drollery and its pathos, for though my father and myself preferred to dwell upon the humour of it all, it was really rather pitiful that a man who had studied photography under Daguerre, and chemistry under Baron Liebig and Professor Hoffman, should be moiling and toiling as he was, often with only his young son to help him, in a small top back room in Holywell Street, with the patient housewife's kitchen utensils used for the etching baths, and the zinc plates perforce used over and over again. If I should ever be a "ruler of the King's Navee" it will certainly be because "I polished up the"—plates—so carefullee." I remember that one night, at a time when my mother and sisters were living at Ramsgate, the fumes of the chemicals in our room in Holywell Street made me delirious. Somehow I was taken on to the roof to get what fresh air there might be and to recover myself. It was not all like this. My father did fairly well at times; but about thirty years ago his inventions had for a time proved to be the mother of necessity.

Our struggle during the first throes of invention may be judged when I state that for a whole year I worked upon a plate of one particular picture, meeting failure after failure, though we won through all right at the finish. All this sort of thing resulted in my getting a practical acquaintance with pretty well all the technique of plate making; and of that I feel the benefit every week that passes. I never call on any of my helpers to do anything which I have not some ground as one "who has been there" to believe is but a reasonable claim, or shall I say,

challenge, to put to the man At the same time, anything which at
would slip into myself, I feel that I may fairly call on them also to " t
Fleet Street expects that every man, every day, will do his duty

We have one constant comfort. Monstrous as are the exactions of c
on any day, we always know that they are nothing in comparison wi
they will be to-morrow

After five or six years' work in photo-engraving management I st
my own in '87 with half a dozen workers, of whom most are with me
It was an uphill game, although I could sometimes get 2s 6d per inch
tone blocks and 1s. 0d. for " line." The screen distance regulators, as w
them now, had not come then into general use Three-colour was quite " c
even to general engravers, although I believe F E Ives made his first
three-colour in '81 in Philadelphia—" where they love the brethren an
the lawyers "

From 182-3, Fleet Street, we moved on to No 184 The next im
development was the opening at Knight's Hill Then came an addition
and Chicken Court and the opening of the foundry at Goldsmith's Cour
me own up that keeping an " always open " foundry is apt to be a heavy e
But at times one gets duplicating orders of great quantity and urgency a
by a policy of being always on the spot, and with strong equipment can
coped with. To do them justice electrotyping customers are willing t
pensate for heavy burdens of work by light burdens of specie, in satisf
They have got to know that the copper is simply melted and spread on
spatula before receiving its impression, and they don't see why so much
be charged.

The next and a most important acquisition was the one-and-a-half
extent Wolfington Road works of the Meisenbach Company, at West No
Perhaps I myself have hardly done justice to this notable branch. Cr
up as we were at Fleet Street, it was a refreshing change indeed to be w
on premises where good mechanical time-and-labour-saving notions could
receive a fair trial, and I frankly claim that the way we have installed ou
at West Norwood, arranged our fittings, and generally reduced all non-prod
exertions wherever we saw a chance, has had an immense deal to do wi
success achieved.

The next development was the erection of more works and studios at K
Hill. These came in between building developments at Wolfington Roa

In day to day working, the rush work is done at Fleet Street. We b
second day's work every day at Fleet Street at about seven p m. A lot of s
contract jobs are carried through in some of our places adjacent to Fleet S
and the finer monochrome half-tone, much of it of large size, is done at Wolfi
Road ; while the Hentschel-Colourtype work at Knight's Hill tells its own

It is in the development of colour work more particularly that we c
to make what is now Foreview far eclipse what is now Review. We have deve
our own colour sensitive emulsions and in various particulars Mr A. T. C
a co-director and a tower of technical strength, works upon quite special
We have been obliged to supply prints of many of our best colour blocks, si
because our customers declared that they could not get them properly pri
But it is only the very finest plate printing that we ever agree to underl
and we don't really come into general printing competition at all, because w
at considerable expense in performing this fine art printing service and our ch
have to be correspondingly somewhat above ordinary rates.

My expectation is that newspapers will increasingly use half-tone bl

And I claim that we do service to other engravers as well as to ourselves in that we are continually pressing upon the newspaper manager's notice how he can help forward his journal's prosperity in this way, provided he will obtain strong plucky negatives, with shadows fairly massed, and in reasonably strong contrast and will let one use just the screen that will suit his paper. In a general way we advise that 1¾d. at least should be paid, less discount for a quantity. I had better explain that this price refers to paper, or I shall be told that Hentschel's 1¾d. per inch for half-tone blocks is playing it rather low down! I have at times been accused of being what is called an "honorary block maker"; and perhaps engravers will some day be as candid as the printers have learned to be, and will own that they have often been sinners against themselves in the devil-drive of business. But will my good friends and brothers of the craft let me simply say for Carl Hentschel Ltd., that our worst crimes are those we have not committed.

Not being altogether too old at forty and being confronted with the certainty that the sixpenny illustrated weeklies must—simply must—sooner rather than later, publish regular weekly coloured supplements, we are steadily preparing for the new demand. I do believe that engravers can always do a great deal to create demand for their work. If I have any message at all to the craft, it is simply to suggest to them that we should all of us keep in view the indefinite character of the requirement for our services. That is the terror and the comfort. Personally, I have not the slightest doubt that the amplest days are the days in front. Vendors of goods must illustrate, and must illustrate well. And perhaps some day the fact will be realized that even the poor engraver, though so willing at all times to *rush* out his plates, can never do this rushing without something being less perfect than otherwise it might be.

A few years ago it occurred to me that we ought to supply photo-litho half-tone transfers, and we do this in our Meisenbach department, having equipped ourselves for taking transfers up to 72 in. by 52 in. We use printing frames with pneumatic cushions. The saving of time in showing proofs to the customer in this photo-litho half-tone connection is a very important consideration to him. Re Hentschel-Colourtype, I may say that as far as possible, we standardize in all our colour work; so that our managers frequently have the great satisfaction of passing proofs almost at first showing.

We like the indirect lighting by inverted arcs; we manage to secure practical daylight effects continuously, and the same colour appearances by day and night. We arrange cameras in rows where we can—ten or more in one row in one room at Wolfington Road. 30 by 30 is a favourite size with us. We give every artist his own motor-worked aerograph. We like large copying boards. We often observe a 40 feet distance in producing negatives from original objects. Our proofing is done on a battery of over 20 platens, nearly all Colt's Armouries, with some Victorias; and for proofing larger work we have also two Miehle two-revolution presses. I may say we have worried the makers to make some "two-revolution" improvements. Of course we do some post-card business—but strictly *entre nous*, neither the very large nor the very small half-tone work is particularly profitable.

May I end with sincerest Christmas and New Year's greetings to all fellow-workers in any branch of the graphic arts.

PRINTERS! HERE'S TO YOU!

By H. WHETTON.

(*Editor, British Printer*')



Zinc Etching by HAWKES & Co

Design by W GILLIARD

OMEHOW one hears with almost wearisome m of the great, the unprecedented strides made or that community, trade and art, but it is suf curious as to become matter for uneasiness, that printing, which is undoubtedly the veritab preservative of all arts," is usually overlooked connection

Now let us remember that we are "citizen mean city." We are members of a craft which d of its votaries their highest and best, the brain, the highest of education and acme of han Whilst printing is nothing if not practical, it is to-day that theory literally goes hand in han practice, and we have the mathematician wi mechanician, the colour scientist with the photog the artist with the designer—all these servic drawn upon at their best to furnish that very w ful consummation—modern printing.

We—as we square our shoulders—we of the elect—know how prin ever the handmaid of all arts, crafts and industries, and we claim boldly t the craft of Gutenberg is very largely due the very growth of civilization—w it be towards peaceful ends or to that other variety which spells W. A. R.

Up to a recent date changes and improvements in the means of pi came about slowly and even imperceptibly, so much so that such were only by the few. But of late years inventors the world over seem to hav centrated their attention on our craft, and the result is a perfection in fast presses, accurate flat-bed colour machines, aluminium rotary machines, types, Monotypes, three-colour pictorial reproduction, surfaced standardized type, coloured inks of the best, and, in fact, all mann "supplies." These tend to explain the present position attained by the ar its indissoluble ties with national and individual life, with business recreation, with education and research.

At the same time we must be up and doing in order to keep pace wit century's progress. This is to be a survival of the fittest only. No one talented, too able, too skilled, too good for this or the coming stages of the pri business. And if exacting and onerous in its demands upon members o industry, so in proportion will be the reward.

Knowing this, above all things remember that no finality is atta Inventions and developments follow so closely on the heels of each other nowa that he would be a very daring individual who claimed finality for any chi his brain or product of his fingers designed to be a factor in the daily wo some industry. We do not always realize this—as often as not we have no d to perceive it—but changes come and improvements follow as surely as n follows day.



MDLLE. LAPARCERIE.

Three Colour Blocks by
A. E. Dent & Co., Ltd.



Fig 3



Fig 4



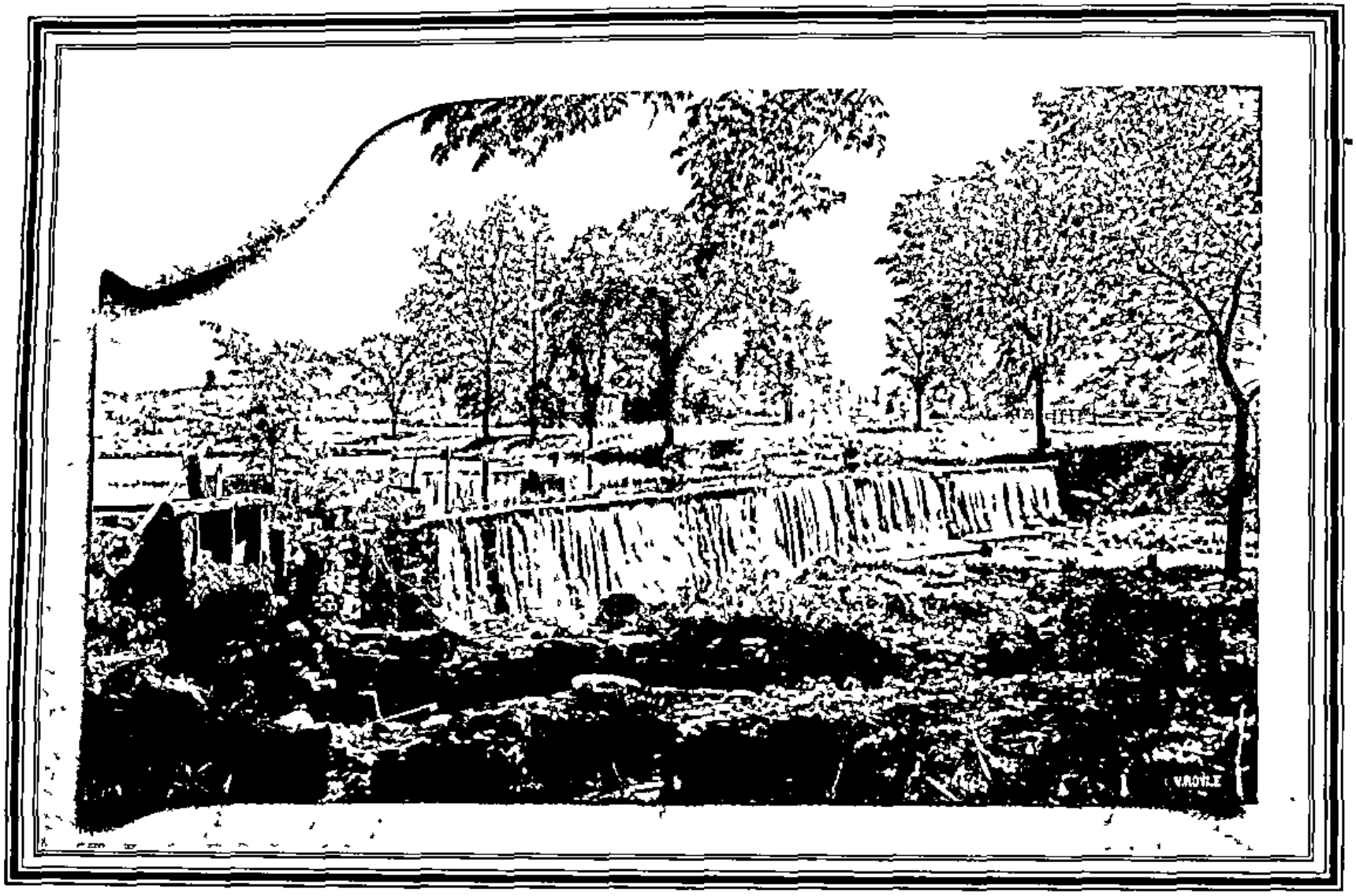
Fig. 5

Fig. 2, photograph with a pinhole of $\frac{1}{15}$ in., equal size to the image of Fig. 1, and Fig. 3 photograph with pinhole $\frac{1}{8\frac{1}{5}}$ in. of the print Fig. 4. Fig. 5 is from the same picture also taken with a pinhole.

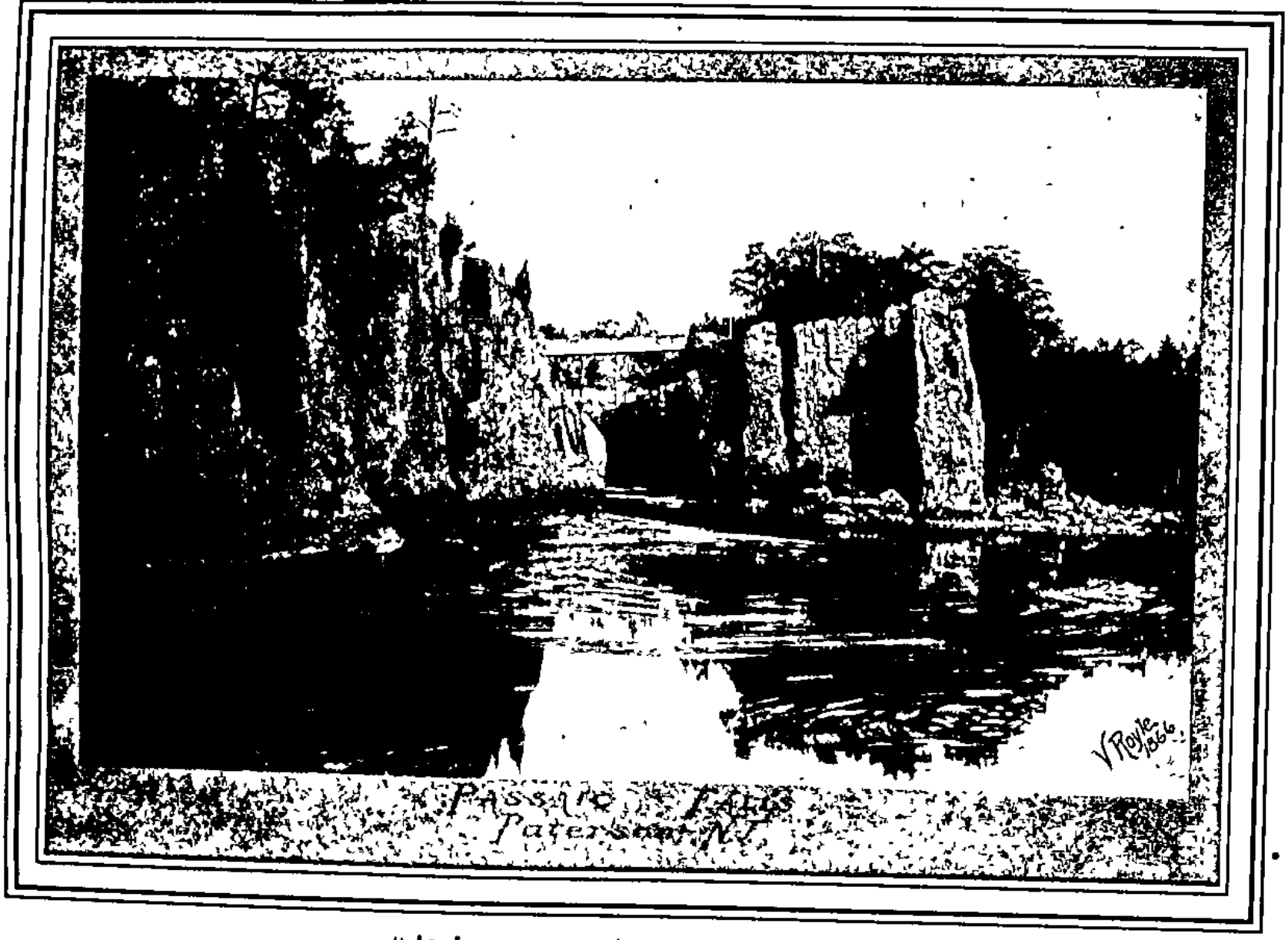
I may remark that I have taken intentionally an engraving of the head of a man, as the lines are more accentuated than in the ordinary engraving in which the lines have more the fineness of those of the head of the woman.

I have not retouched the negatives, so that it may be seen that it is sufficient to accentuate on the photographs with the pinhole the contours of the eyes, mouth, etc.

It is also to be remarked that the image of the pinhole is misty. I do not pretend to have indicated the most important applications of this idea, which I announced in 1889, of employing a little pinhole for the reproduction of engravings with the disappearance of the lines.



VAN WINKLE DAM.



"As if in some convulsive spasm,
The summits of the hills had cracked,
And made a road for the cataract."—*Longfellow.*

300 Line Half Tone by
The Walker Engraving Co., New York



" A willowy brook that turns the mill,
With many a fall shall linger near "

200 line Half Tone by
Walker Engraving Co., New York

Lined on
Royle's Lining Beveller

A GLIMPSE OF AMERICAN AMATEUR PHOTOGRAPHY IN THE SIXTIES.

By CHAS. HEATHCOTE, Paterson, N.J.



Zinc Etching by Bolton & Co

Design by W. Gilliard.

TO look at the photographs given on the pages preceding this article and to consider the fact that they were taken more than forty years ago, and by an amateur, one is provided with plenty of food for reflection. Perhaps it is not too much to say that the effects here produced are quite worthy of recognition amongst the best company of the present time, and though the facilities now at command may show many improvements over what existed at that period, yet the fact remains that as an artistic and meritorious piece of photography, the pictures will compare well with the best results of to-day.

Amateur photography in the United States forty years ago, was very different from what it is now, or even from what it was in Great Britain at that time. Outside a few professionals—and less amateurs—the art was regarded as a most mysterious and wonderful invention, and anyone taking it up as a hobby, would find many obstacles strewing the path to success. The few professionals who followed the calling guarded the secrets of the business with a zeal worthy of a better cause, and the poor amateur had to rely mostly on his ingenuity in becoming anything like proficient in the knowledge of his fascinating subject. The dearth of information was just as conspicuous then, as the copious fund of it is now, and when we think of the books, magazines, colleges and many other mediums of education all at the disposal of the amateur now-a-days, the comparison of conditions in this respect alone is truly remarkable.

At the time of which we write, photographs were taken by the wet plate system, this being the extent of the matured developments up to that period What inconveniences such a primitive method presented, particularly to anyone enthusiastic enough to cultivate a desire for taking landscape scenery! Think of it; when out upon these excursions, our ambitious amateur had to take all his goods and chattels along with him, and when it is remembered that a dark-room as well as all other necessaries was required to be on the spot to meet the exigencies of the case, it must be admitted that it was no trifling matter to take a picture a mile or two away from home. Not only this, but it must be borne in mind that by this old-time process, a plentiful supply of water had to be on hand, and in taking out-door views, some beautiful and tempting spot—say at the top of a high hill—would not offer the advantages of a running stream or other supply. To overcome this difficulty, the water must either be carried

up the hill in pails to the seat of operation, or immediately the photograph was taken, the plate would have to be carried down to the water, and that rather precipitously, in order that it might arrive in the bath before it had time to dry As can readily be imagined, the former plan meant lots of hard work and in the latter, no matter how fleet of foot our ardent friend happened to be, the run from the camera down the hill to the water would invariably make him so tired and breathless that upon his arrival he did not much care whether he developed the plate or not.

The transportation of this equipment from point to point, in all its magnitude, was not the least serious of inconveniences that had to be contended with Camera, chemicals, pails, baths, portable dark-room, and other incidental appurtenances had all to be provided for and taken along. What a difference in the outfit of to-day? A neat little box, almost small enough to be accommodated in the coat pocket, is now all that is necessary in the way of baggage, when out for a similar purpose. Perhaps a word regarding the portable dark-room may be of some little interest to the reader Let us take, for example, the one in which the two photographs referred to, were conducted through their various stages; by the photographs we mean of course the negatives This dark-room in question was an improvised tent arrangement, made of rubber cloth, suspended by wooden stays, which, when folded up and enclosing all its appurtenances for developing, etc., looked uncommonly like a dress suit case. When opened out for service, it afforded all the facilities available for sensitizing, developing and fixing the plates as they were required. Two sleeves, through which were passed the arms of the photographer, tied at the wrists, permitted free movement of the hands for all necessary purposes, while at the same time remaining perfectly light-proof. A ruby glass window at the top provided means through which operations could be directed, and the whole must be considered a cleverly devised contrivance for serving as substitute for such an important factor of the process.

To see photographs taken in the States in those days, was something very novel, and consequently a crowd of curious urchins—and older folks as well—very much to the discomfiture of our enthusiastic friend, invariably accompanied him as he took his walks abroad in quest of nature's tit-bits. It was no unusual occurrence for Mr. Vernon Royle, of Paterson, N.J., the gentleman who took the pictures which we have before referred to, to be compelled to have police protection against unruly followers, when out upon these expeditions. Truly, it must have been a remarkable sight to see that worthy, then quite a youth, wheeling a barrow containing all his paraphernalia, with a big burly policeman trudging along by his side, acting in the capacity of body-guard. This following in itself was not very agreeable, but infinitely worse were the annoyances he was subject to, when engaged in the actual performance of picture taking, and its preliminaries Possessed of a mad desire to be included in the photograph somewhere, the crowd would resort to all manner of tricks to achieve their purpose, and it was only by the stern measures of the officer of the law, and the greatest strategy on the part of the photographer, that their strenuous efforts in this direction were frustrated. Amusing though all this may seem now-a-days, yet it is nevertheless a faithful representation of a few of the conditions under which our subject pictures were taken, and to the credit of our friend be it said that even the great difficulties under which he had to labour, did not in the least dampen the ardour of his zeal, as later events clearly proved.

From these few cursory remarks it will be readily appreciated that the pursuit of amateur photography during this period, was not conducted on

flowery beds of ease. In reviewing the situation under its present circumstances. one may perhaps be pardoned for wondering how many of the vast multitude engaged in the craft to-day, would stand loyal to their hobby in the face of such difficulties and annoyances even such as those we have cited. When we see the remarkable results that have been attained, however, in spite of such remarkable odds, we are bound to confess that after all the game was worth the candle, and notwithstanding the rapid strides which have most unquestionably been made in the art in recent years, the meritorious productions of forty years ago must rise before us as striking monuments of great accomplishments.



NORTH AMERICAN INDIAN WOMEN.

Half-Tone by
PHILIPSON, SON & SAILEFFER

Photograph by
STUART & WHINFIELD

WHY PROCESS WORK STANDS STILL HERE.

By WM. HUGHES,

Editor "Engraver and Electrotyper," Chicago

ONE reason why process work has made no marked advance in the United States during the past ten years is that this great country has been in the grasp of a raging dollar fever during all that time, or longer. The mania to get rich quickly seized the photo-engravers in 1896. One of its main causes is traced back a third of a century ago, when two Englishmen, named Clarke and Andrews joined a young man named John D. Rockfeller in the oil business. These men worked hard, laid a sound and sure foundation for great success, organized the famous Standard Oil Company, and after fighting with hordes of rapacious politicians, avaricious railroad companies, and some base competitors, their company developed into the biggest "monopoly" on earth. About eleven years ago they began to pay enormous dividends, aggregating from forty to fifty millions of dollars a year. That produced a madness for millions. Big "trusts" followed, and a crazy race for wealth broke out. The Standard "crowd" attained their success by legitimate means, hard work and years of waiting. Carnegie and others had succeeded in a similar way. But the mad hunters for riches went in for high finance and ruin-your-neighbours short cuts to get to where the others had reached by long years of patient labours. And to cover their dishonest tricks they set forth that the Standard Oil Company had succeeded by such unjust methods as the get-rich-quick fellows were adopting. The photo-engravers were carried away by the manufactured "history" of Standard Oil, and started to imitate the methods *attributed* to the oil-men, and in ignorance of the true methods which had so succeeded.

In the fall of 1896 the engravers organized, and some of them conspired to monopolize the business, drive away the majority to ruin or other businesses, and carry all before them. Millions appeared right within their reach. The "small fellows" quaked with apprehension. But the most alarmed were the workmen, who came together and organized a strong union forthwith, and laid plans to prevent the monopolizing of the business by a few of the big fellows. The union soon become masters of the situation, and the workmen still hold the reins. Prior to that monopolizing craze, experiments were carried on in rooms adjoining many engraving plants. Discoveries were made, improvements were adopted, and there was a general alertness for the latest and the best. But when the "fever" came, then all experiments were abandoned. The chief concern of what are known as the "association" employers has been, and now is, how to have a little more to say as to the rules of conducting their own businesses, and to curtail the power of the union. The men, on the other hand, keep on strengthening their union, and they are so intent on watching the movements of some of their employers that they have no time to think of experiments or improved methods. See ?



THE CONVOLVULUS SWING

A HIGH-LIGHT PROCESS.

By BURMAN NORTON.



THE NEW BOAT

If Tone by
NCHESTER WOOD
GRAVING Co, LTD

Photograph by
J. M. STUART

BY reproducing wash drawings and pencil sketches, devoid of screen tint, in the highest light, *viz.*, absolutely white paper in the print (which means the screen negatives must be opaque in the highest light), you get a print the high-lights of which are represented as bare metal, and the next tone to the whites will then have its true relative strength with a softness of gradation right down to the shadows.

Assuming that the negative is technically perfect, the resulting print on copper is a fac-simile of the original, and in the etching of this plate it is of the utmost importance that *all the colour of the plate be kept.* This can be aided by silvering with nitrate of mercury, then rolling up, burning out the silver, and giving a 4 or 5 minutes' bite; silvering again and running the ink to take up the shoulder of the first etch, treating in the same manner the other bites, until satisfied you have printing depth. If these conditions are complied with in the etching, on proofing you will have all the sparkle of the original drawing. The majority of wash drawings depend upon purity of the whites for their pleasing effect, and in the case of pencil sketches the charms of the delicate grey lines need absolutely white paper to enhance their values, and no other method can reproduce this class of work satisfactorily but a high-light process.

In the usual procedure of making an ordinary screen negative and painting out all the pencil lines after the necessary amount of etching, and then biting away the surrounding tint, no matter how carefully executed, it is impossible to get a true fac-simile of the original, as the freedom of the artist's lines is interfered with.

Therefore, a perfect high-light screen negative will give a fac-simile etched block without the intervention of the fine etcher. There will be, of course, exceptions; some subjects may need burnishing, but it is practically automatic etching, as in the line process, running the ink after each bite, taking up the shoulder and at the same time the ink fills in the work, according to the relative tones. With this article is printed a small reproduction of a difficult pencil sketch, owing to the delicate treatment of the artist. In making the continuous tone negative from this original collodion emulsion A was used, cutting and intensifying with lead, and from this negative a screen positive was made in the usual way, on a wet plate, with a 200 ruling. By using this ruling it is more difficult to get a clean reversal than if a coarser ruling had been utilized, which demonstrates the practicability of the process advocated. I am aware there are more

direct methods of making high-light screen negatives by manipulation of the stops, but in this case the entire elimination of the dot in the lights is not possible. By the indirect way you obtain this necessary quality with certainty and correctness of gradation, with the advantage of having a screen positive holding the exact amount of colour, which is on the copper at the start enabling the etcher to judge precisely the ultimate result, providing all colour is kept in the etching. So much for the preface. As it is impossible for me to give a clear idea of the procedure without repeating myself, I now give a summary of the technical details.

You take the wash drawing, or pencil sketch, pin on the board and make an ordinary continuous tone negative, either collodion emulsion or wet plate (decidedly the former for pencil sketches), develop negative fairly dense, if pencil sketch cut and intensify with lead Dry negative off and place in transparency holder as usual, film away from lens, and make the screen positive, using stops you are most familiar with; but endeavour to close up as much as possible the shadows. Treat this positive in exactly the same way as you would half-tone negatives, *viz*, intensifying with copper and silver, cutting with cyanide and iodine until all the points *are gone* in the *highest lights*, when your shadows will slightly open to small round dots, if the exposure has been made correctly You have now a screen positive, which on comparison with the original will be found technically perfect as to gradation, etc

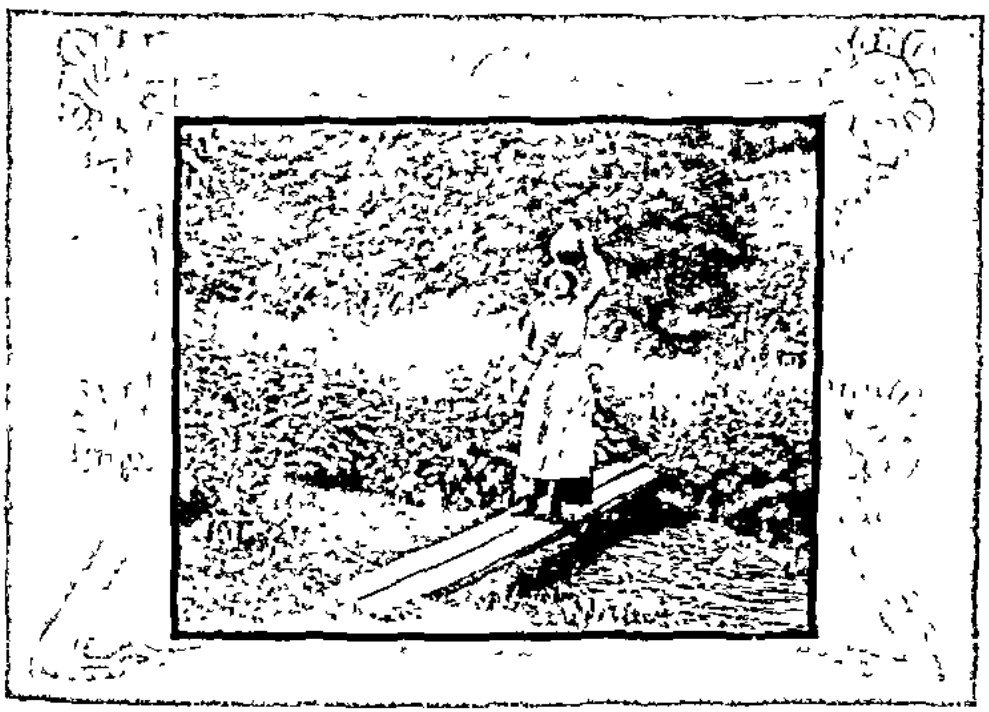
Having approved of the screen positive, it has now to be printed on the metal; for the coarser rulings, say 120, the positive can be handed to the printer, who will sensitize the metal with line albumen. After exposure the same is inked up and developed in the ordinary way. Dust plate with carbonate of magnesia. The plate will now be ready for flowing with the reversal enamel, a process worked out by Mr. Newton, principal of the L.C.C. Process School, Bolt Court, E C. This process is thoroughly practical for the coarser rulings, but for the 200 rulings making a negative from the positive is more certain, and the most practical way of doing this is to put the screen positive in the dark slide carrier, placing three thicknesses of blotting paper in the corners for the separation of



Block made by High Light Process.

the films. Press the wet plate against the positive and take out to the camera, exposing on white paper with //45 stop to give a straight point of light. This will give you a perfect screen negative, which will stand cutting and intensifying in the usual way, yielding an ideal print in enamel. Treatment in the etching has been defined in the former part of the article, making needless any further explanation of that process. But a few comments on the application of this high-light method to colour work may not be out of place, as it has some advantages not to be overlooked, *viz.*, for commercial designs with a full complement of lettering, which has to be reproduced slick and sharp on white paper, and the work more or less unsupported with vignettes, etc. This process would reproduce this class of original more truthfully and in less time, as the plates when etched could be silvered and proved in colour, and when approved rolled up and deep etched in the ordinary way. Better than outlining with graver and routing; that is where the time goes on reproductions of this sort. And if the high-light negatives were made correctly the balance of colour should be perfect.

Anyhow, it gets process out of a rut to try these modifications, and makes for improvement in reproductions of originals which lend themselves to a high-light process.

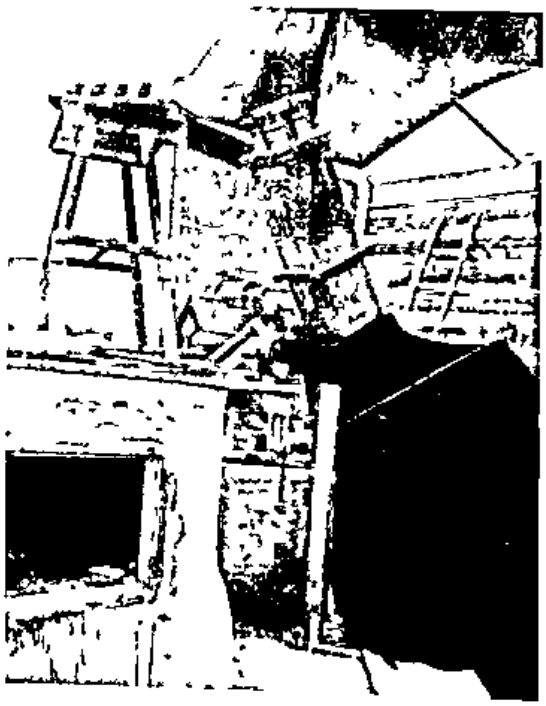


On the Way to the Spring

Half Tone by
Bourne & Co.

Photograph by
Graystone Bird

THREE-COLOUR PHOTOGRAPHS OF THE ECLIPSE.

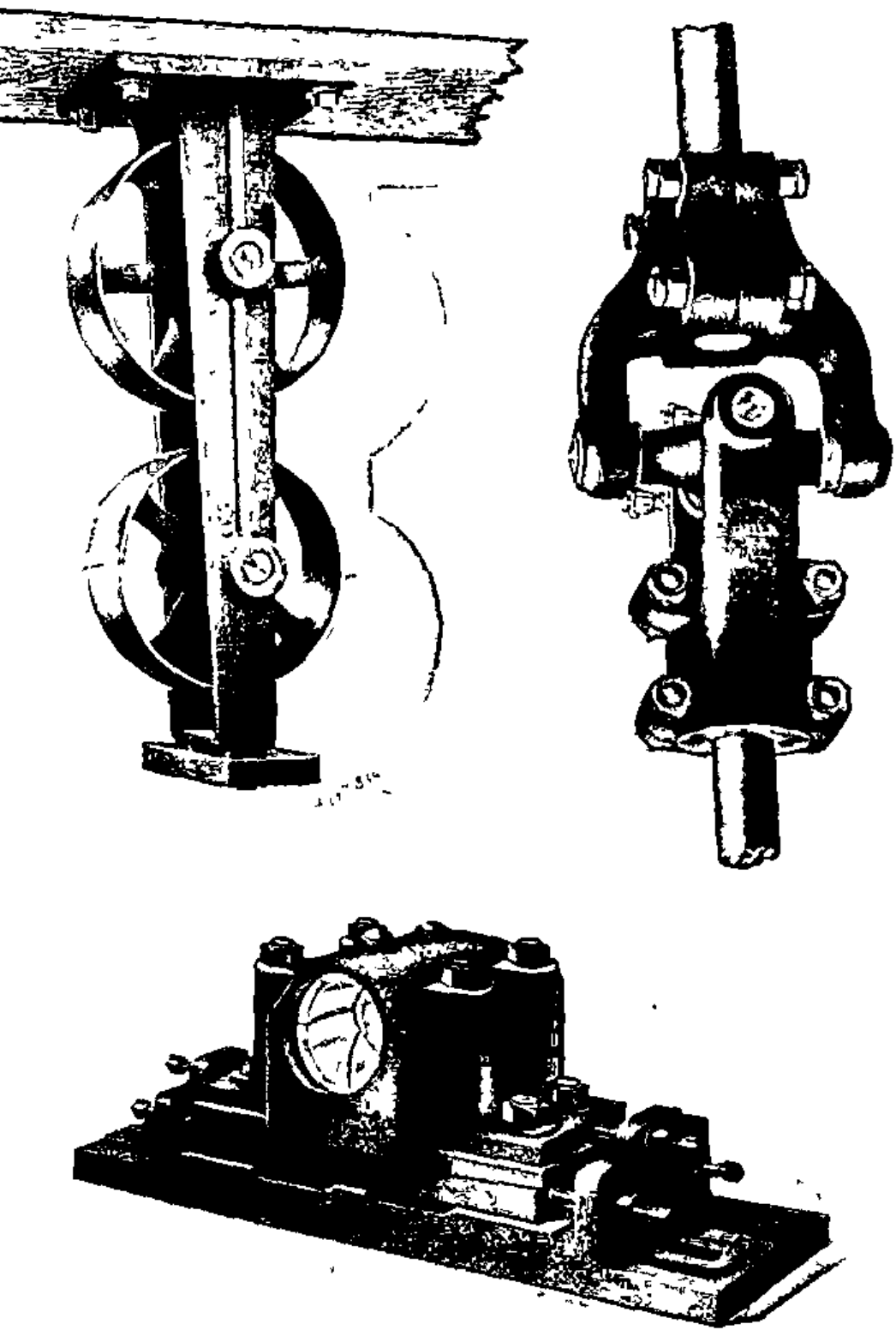


WE illustrate herewith the equatorial telescope used by Professor Dr Mengarini, of the University of Rome, at Torreblanca (Spain), for taking trichromatic photographs of the corona during the eclipse of the 30th August, 1905.

The equatorial has 4 objectives of 2 metres focus and 81 millimetres diameter, specially constructed by Mr Mailhat, of Paris, worked at a distance by a pneumatic system Behind the objectives were placed the Klein's colour filters red, green and violet, made with special accuracy by Messrs. Penrose & Co. The plate, 24×24 cm., received the three images of the corona passed through the filters, and one image with white light for comparison.

The plates employed were the Perchromo plates of Otto Perutz, in Munich, and the exposures averaged :—White $\frac{1}{10}$ second, violet 3 seconds, green 9 seconds, and red 15 seconds. The results obtained are highly satisfactory. We give a reproduction of one of the negatives, but this being greatly reduced hardly conveys the detail and effect. The translation of this negative into colours will be awaited with great scientific interest. It will be made by the well-known house of Danesi, Rome.





NOTABLE EXAMPLES OF MECHANICAL ILLUSTRATIONS.

Showing the use of tint blocks to give colour and bring out machinery in contrast to the background or unimportant details.

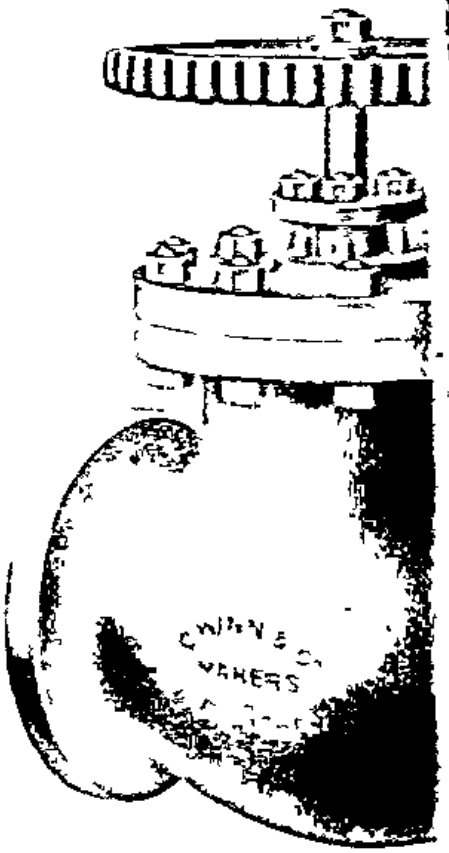
Drawn and engraved by
Gatchel & Manning, Philadelphia

Displayed by courtesy of
The Geo V Cresson Co Philadelphia



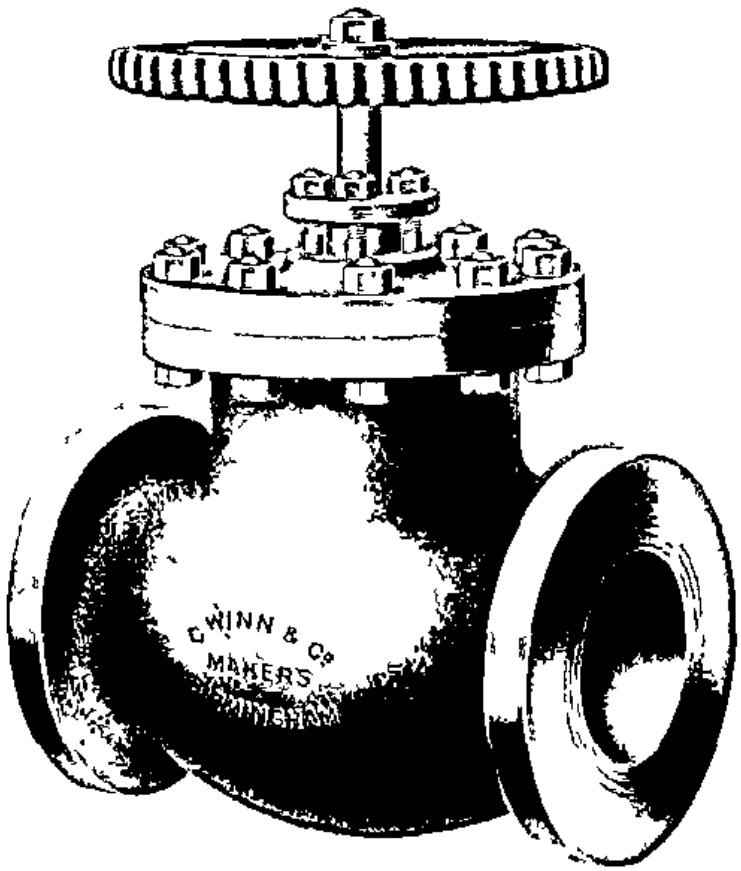
CATALOGUE ILLUSTRATION.

Half Tone made from
retouched photograph by
Gatchel & Manning, Philadelphia.



CATALOGUE ILLU

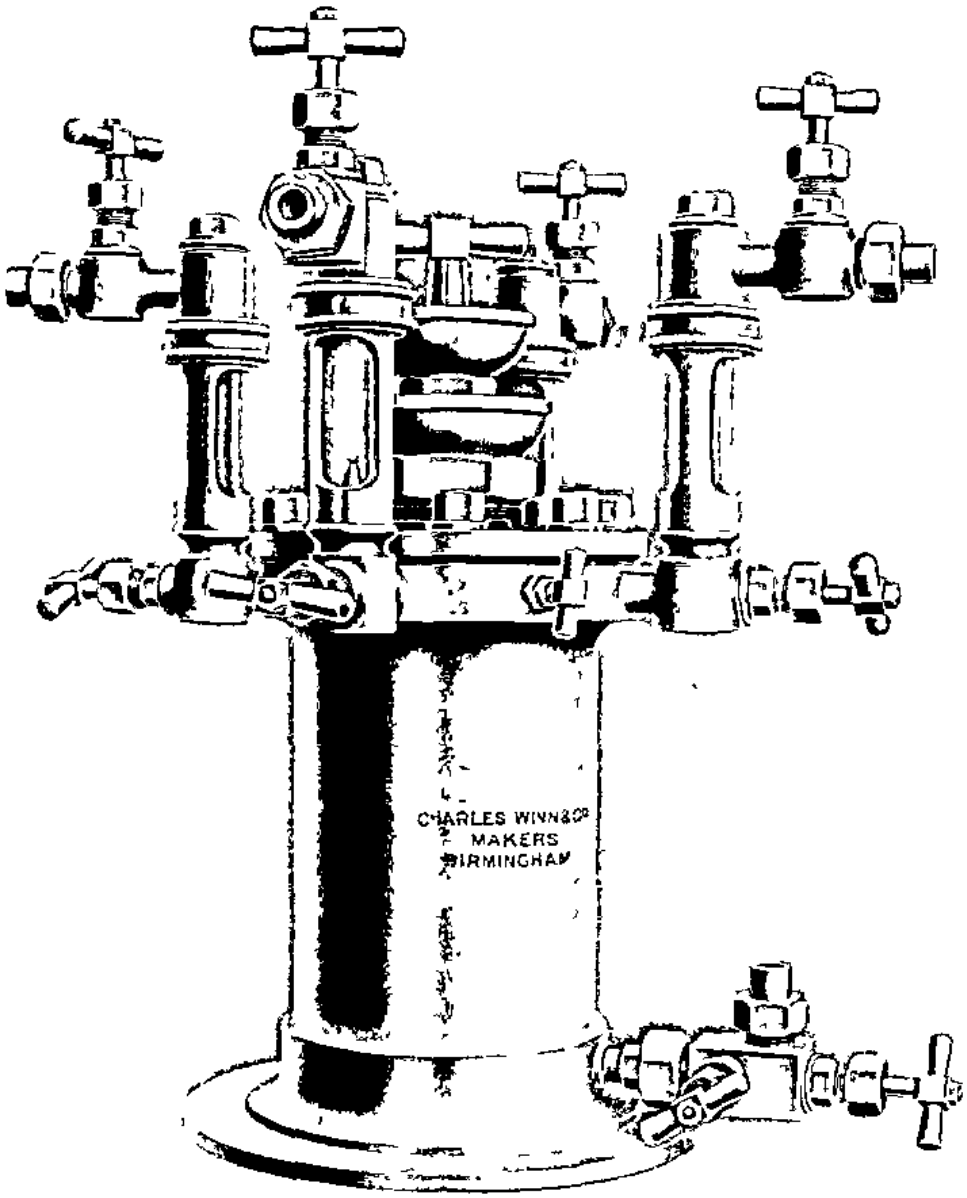
Photographs and Blocks by
Wright & Gilbert



CATALOGUE ILLUSTRATION.

Photograph and Block by
Wallage & Gilbett

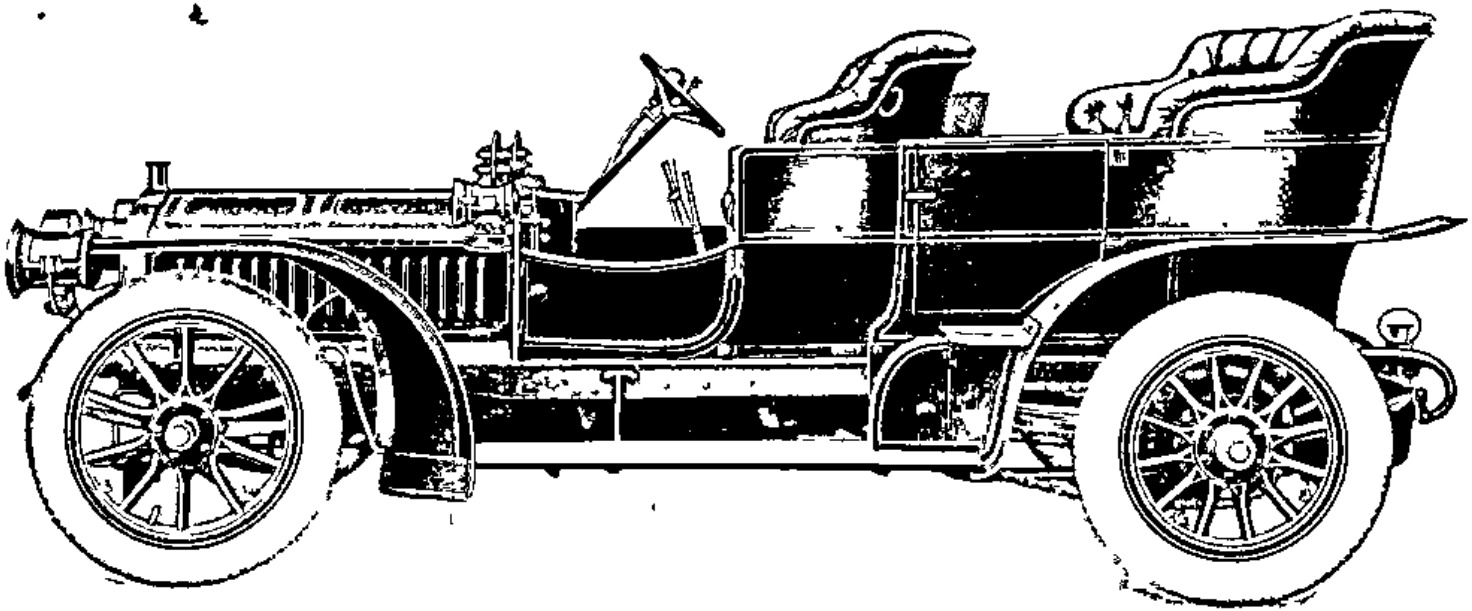
By kind permission of
Messrs Charles Winn & Co



CATALOGUE ILLUSTRATION.

Original and Half Tone by
Wallage & Gilbett

By kind permission of
Chas Winn & Co.



A NAPIER CAR.

Drawing and Half Tone Block by
Ashworth & Meredith



DESIGN FOR COVER OF DRAPERY CATALOGUE.

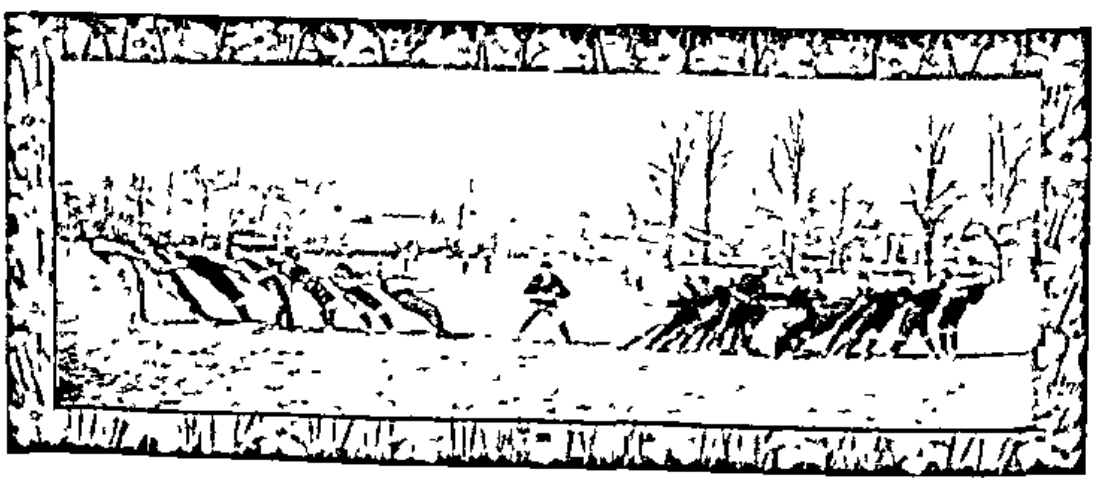
Two-Colour Blocks by
John Swain & Son, Ltd.

brushes in relation to the plate and the degree of their pressure upon it Apa from this preliminary adjustment, the process is entirely automatic.

The plate to be powdered is laid on the receiving table, face up, again the projecting prongs of a carrier bar; the machine is then started, a sm handle is next pressed down to bring the cylindrical feed-brush into operatio the plate is now carried forward by the carrier-bar under the feed-brush, then onward under a gang of elliptically moving flat brushes which pack the powd on the plate and clear away the surplus, still forward through a gas furnace wh melts the powder in place, and finally on to a cooling table, where the hot pla is swept on both sides by an air blast which quickly cools it in readiness for repetition of the proceeding in another direction through the machine

Putting the plate in its proper position on the receiving table, adjusti the gang brushes if necessary, starting the machine to go and bringing the fee brush into operation is all the etcher has to do. When the plate passes t feed-brush the latter is automatically lifted out of operation, when it reach the furnace, the gas is automatically turned on and lighted, when it arriv at the cooling table the air blast is automatically started, when it emerges fr the furnace the gas is automatically cut off, and when the plate is cooled to proper temperature the air blast ceases and the machine automatically sto By this time, 75 seconds from the starting, the carrier-bar is back in its place the front of the machine and the plate is ready for the next operation.

The furnace of the machine can be used by itself, independently of the re of the mechanism, by turning on the gas through a lever-handle cock on a by-pa The cover of the furnace is hinged, so it can be raised to take in a plate to be warm or dried. The furnace is handy to dry plates after each etch, and is serviceal for all the purposes of an etching-room gas stove generally. It can also be us to dry reversed negatives, in "lay-outs" on plate glass, the heating of the gl from above and below at the same time precluding the danger of cracking while drying the negatives very quickly.



A Tug of War

Design and Half-Tone by
Lascelles & Co, Ltd.

From a photograph by
Reinhold Thiele

CONCERNING THE MERCURY VAPOUR LAMP.

By A. C. AUSTIN, New York.



Line Zinco Etching by HAWLEY & Co

Design by W GILLIARD

WHILST I am for I am also against the Mercury Vapour Lamp. It's excellent and it's not worth a cent. I could not do without it, and I would not have it in the shop at any price. It is the cheapest form of electric lighting on the market, and it's expensive in a busy shop. All of which seems sufficiently contradictory to warrant explanation and so I shall tell you briefly my reasons for not liking the lamp and also why I appreciate it; why I am contradictory.

Every photo-engraver knows what the Mercury Vapour Lamp really is; a glass vacuum tube with a wire sealed in each end and with quicksilver for its electrodes; that the current vapourizes the quicksilver which becomes incandescent within the tube, giving out a brilliant light. It radiates very little heat, does not materially affect the eyes and is almost entirely noiseless. It consumes very little current as compared with other forms of lighting and it wears well.

As regards its application to the needs of the photo-engraver, the manufacturers say :—

"For photographing wash drawings it is the only artificial light giving as good results as daylight" (?)

"With two of the photo-engraving lamps consuming about 7 ampères, exposures can be made in six minutes, where two lamps taking 25 ampères take eight minutes. The efficiency of the vapour lamp is therefore over 4·5 times as great as the focussing arc." (??)

I am going to contradict these statements, at the same time apologising for any seeming discourtesy, which is not intended, and for any conceived inference as to the truthfulness of the foregoing. I simply differ in my opinion.

I do not believe the light has much to do with the first assertion regarding wash drawings. A *good* operator is *the* factor—vapour lamps, or open arc lamps, it's all the same. "The man behind the gun" gets the result according to his ability and if he isn't able to do it with the open arc as well as with the vapour lamp he's not the man for me.

I must also say that my experience convinces me that as photo-engraving lamps, the mercury vapour lamp, in practice, is slower than the arc lamp and that, while it may consume less current, the saving is more than offset by the necessary waiting during exposure.

I find, too, occasions where the Mercury Vapour Lamp is a decided disadvantage to the operator. The entire absence " of red produces a considerable distortion in colour values " which in photographing *some* copies causes much trouble. And, of course any attempts to use the light for colour work could only result in failure. I suppose it might be possible to balance a set of colour filters to the peculiarities of the vapour lamp, but it is hardly practical

The absence of the red rays is one of the serious drawbacks to the general use of the vapour lamps. The light is uncanny. One's flesh takes on a sickly yellow hue, while the lips, the veins in the hands, any little eruption or a " jolly red nose " stand out in startling relief, a deep bluish purple against the pasty flesh It is not pleasant to look at.

In our own Coney Island there is a popular attraction where the seekers for sensations are supposedly taken to the bottom of the ocean or some such place, and at a certain time everything is lighted up with this strange light, and the expressions of half humorous horror, as one passenger looks at another, is changed to credulous consternation when the guide assures the ladies that " it will all wear off in a week or two ' "

For scenic effects or for advertising purposes the Mercury Vapour Lamp is most certainly a great success, but it has its limitations.

Now for all I have said against the lamp I yet use it in my daily work with marked success Six tubes in one frame operated by one switch, directly behind a large sheet of ground glass, gives me a beautifully even illumination for transparency work, that is absolutely unequalled. There is no possible arrangement of arc lights that anywhere approaches these six vapour lamps either for speed or equality of light, to say nothing of the economy of current consumption. Furthermore, it is better than daylight, because the actinic quality is constant and failures through error in exposure are very rare. It is especially good for indirect three-colour work.

We have long since ceased to notice complexions and even if we did, certainly fleeting looks would have no weight in comparison with utility. We could hardly get along without our battery of lamps.

It seems to me this is a strong recommendation. You will note, however, that it refers to a special use.

I have found also, in the making of half-tone negatives from rough copy, like platinum prints, that the vapour lamps are particularly useful. The soft brilliant light with its diffusive power, so illuminates the picture that the roughness is smoothed away and the negative is always more satisfactory than where arc lamps are used. This is a point for the vapour lamp, but likewise a limited point.

You see there are good points as well as bad ones. Much that has been said about the vapour lamp is not wholly the truth and much truth has been left unsaid If you weigh it all and if you know what you want, you know what to get and if you want the Mercury Vapour Lamp by all means get it.

I have been using them about four years in the manner described above. They have proved reliable; the tubes last a long while—I think it is nearly two years since they have been changed—and I know they are ready for me any time I put in the switch and yet, if I am asked for an opinion as to the merits of the lamp and for advice as to their installation I cannot fully recommend them for general purposes.

They are good and they are not so good.



Line Blocks on Zinc by
Fanton Howell & Co

Reproduced by permission of
Messrs. Cassell & Co.
From Dante's Purgatory

SOME RESULTS OF ORGANIZATION.

By LOUIS FLADER,

President of the International Photo Engravers' Union of North America.



Zinc Etching by HAWKES & Co.

Design by W GILLIARD.

AMERICAN photo-engravers have long been at a loss to understand the entire absence of unions composed of the European workmen in this craft. Realizing as we do, the many benefits derived from organization, only serves to deepen the mystery, and many are of the opinion, after talking to European workmen who arrive on our shores, that organization would prove as beneficial to the workers in Europe as it has been in America.

Not being familiar from personal observation with the conditions surrounding the workmen in Europe, the writer must confine himself to touching upon the situation from an American view-point. It is here intended to correctly describe conditions existing in America before the workmen formed the International Photo-Engravers' Union, as well as after. European workmen may recognise familiar conditions and perhaps they may also see a remedy, if indeed one is desired.

Less than ten years ago, the American photo-engraver was in the posiiton of the man with an elephant on his hands. He was proficient in a skilled calling, known to but a few, his products were in demand, and according to the laws of supply and demand, his wages should have been proportionate to his ability, and the demand for his labour. In other words, he should receive large wages. Quite the opposite was the case.

A few men, principally photographers and etchers, received good wages and had what might be called an easy time of it. They generally performed their work behind locked doors, and their employers, in all cases men entirely unfamiliar with the details of the business, were unable to judge their work, either as to quantity, or quality. The majority of the workmen, particularly the young men, who were learning the trade and generally doing the bulk of the work, were receiving wages so low as to compare unfavourably with wages paid for unskilled labour in factories.

The following is a fair example of shop conditions of that period. Out of a total of thirty people employed in the department, five were and could be considered journeymen, receiving wages thought to be fabulous at the time, now equalling fair wages for similar work. Twenty-five were young men and boys in the various stages of apprenticeship, in some cases doing journeyman's work, for which they received a mere pittance.

Averaging, as they did, about five apprentices to one journeyman, thus were the skilled men not only under-paid, but were acting in the dual capacities of workmen and instructors, teaching the trade and imparting their knowledge to men who perforce, must shortly become their strongest competitors. It cannot be denied, that at that time, there were some men receiving high wages, but these were the exception, not the rule.

The discrepancy between the wages of the journeyman and the apprentices

was so great, that it in itself created a ruinous and unfair competition in the ranks of the workers. The young men, ambitious to learn and anxious to earn living wages, were constantly cutting the wages of the journeyman, and the condition here described was one to bring the smile of joy upon the face of an unfair employer. This condition would have been an ideal one from an employer's standpoint, were it not for the fact that human nature asserted itself here as well as everywhere.

In reality, the employer was the greatest loser, for the journeyman acting along the lines of self-preservation, naturally laid many a scheme to keep the younger man from learning, and in many ways aimed to protect himself against the system in vogue The results can be easily imagined.

The working hours were from 54 to 72 hours per week Overtime was not generally paid for and men were forced to lose time and consequently wages when business was low In fact in many cases they were forced to lose an hour or more each day during a period when work did not reach them in sufficient quantities to keep them extremely busy

As the workmen were unorganized and consequently unacquainted with each other, and above all distrustful of everybody, no remedy was at hand. A complaint to the employer generally brought forth the remark to seek work elsewhere For the reasons just cited, that was a difficult undertaking and one generally attended by loss of wages.

About this period, many workmen realizing their condition and its effects, began to talk of organization. This soon had its effect upon the majority and one city after another was organized into a union composed solely of photo-engravers, all of which formed the parent body, known as the International Photo-Engravers' Union of North America.

This union comprises fully 95 per cent. of the workmen in the United States and Canada and is composed of 42 local unions, in as many different cities.

The results gained for the workmen through the medium of the union can be summed up as follows :—

1st. The Union has established the 48 hour week, with Saturday half-holiday all the year, in nearly everyone of the 42 cities. In no case do our members work over 51 hours, and but very few work that.

2nd. The Union has established a *minimum* wage scale for its members in all branches, about equal to the highest wages paid in an unorganized community. This is a *minimum* wage scale, below which no member will work, but does not deprive a man from receiving higher wages, according to his ability. Higher wages are received by the majority of our members.

3rd. The Union has established a uniform rate for overtime work. It is at the rate of time-and-one-half for all work done in excess of the regular hours and double time for Sundays and holidays.

4th. The Union has established a ratio of apprentices, large enough in numbers to meet the demand for labour, low enough to keep down unfair competition in our ranks and consequent reduction of wages.

5th. The Union protects its members against unfair treatment; "the concern of one is the concern of all," it assists its needy members, it enforces sanitary conditions in the workshop, destroys petty bossism and last, but not least, attends to the proper interment of its deceased members and pays a death benefit of $75 (£15 12s. 6d.) to their heirs, in every instance where the member was in good standing at the time of death.

Can you *now* understand our astonishment at the failure of our European brothers to organize ?

VARIOUS METHODS OF DUPLICATE PLATE MAKING.

By JOHN S. SUNDERLAND.

IT often appears strange that so little trouble is taken in investigating the merits and demerits of the different methods of duplicate plate making, together with their suitability for the purposes intended The knowledge that should be most useful to publishers and newspaper proprietors is the qualifications of the various duplicating processes. It often happens that large sums of money are expended on plate-making machinery, which is quite unnecessary for the purpose. On the other hand there are instances where workmen are cramped and the output restricted for the want of proper machinery.

It will perhaps be well to first mention some of the methods employed for duplicating printing surfaces. There are several electrotyping methods which consist of moulds made in gutta percha by pressure; moulds made in gutta percha by the action of pouring on the surface of the plate to be duplicated; wax moulding by various compositions and moulding in Ozokerite. All of these processes are capable of producing the best results for high-grade printing of the very best character. In these methods the surface of the duplicated plate is of electrically deposited copper, backed up by a mixture of lead, tin and antimony; and little need be said regarding the usefulness of these plates, except to mention that perfectly made electros by these processes, used in the right manner, *i.e.*, properly made ready, will be capable of producing from half a million to a million impressions.

The latest method is the "Albert" and the "Fischer" systems of electrotyping, by which moulds are produced in lead. On first inspection they appear to be remarkably good. The idea is excellent in many ways, but the perfection of the resulting plates is slightly disappointing, although the inventors claim that their processes are a distinct improvement on old methods. On comparing the results, however, it will be observed that the shadows are by no means so clean as is possible to obtain with the wax method. This lack of detail in the shadows is one of the principal defects of the "Albert" and "Fischer" processes. To enable the reader to understand it will be as well to briefly describe the methods of moulding in lead. Sheets of lead are prepared about an eighth of an inch in thickness, which in the "Fischer" method is corrugated on the back by a roller, leaving the side that is placed in contact with the object smooth. Pressure is exerted by a powerful hydraulic press driven by a motor with various gearings for power, the result being a mould in sheet lead which does not require any preparation except connecting up in the depositing bath. Being lead, it is possible to use hot solutions, and to obtain a good, hard, yet ductile copper electrotype in a short space of time. The method possesses some good qualities, although there are various objections in its present state which will prevent its adoption in England, so that for general purposes the methods that are in vogue in England and America are to be preferred. These methods are moulding in a mixture of Gambia or other good bees' wax mixed with crude turpentine, which is sometimes called "gum thus." Without doubt, electrotypes properly made by this latter process give faithful reproductions of half-tones and general typographical matter.

Reasonably thick electrotype shells will run even without nickelling, for a month and still give satisfaction, as will be seen by results after half a million impressions have been obtained, in comparison with new plates the difference is but slight It will therefore be an advantage for publishers who issue very large editions of books containing fine grade illustrations to incur an initial outlay in obtaining good electrotype plates, as the excellent results in finish will warrant the expense It is sufficient to mention that by duplication good electros enable exceedingly large numbers to be printed at short notice

Next in importance to electrotyping is the celebrated "Dalziel" hard metal stereotype process, which is still largely used. It may be stated, however, that at the present time there are substitutes which obviate the somewhat lengthy "Dalziel" method of moulding. It is not possible to make a large number of plates from the one mould with the latter system So that though the "Dalziel" method of stereotyping is the best in point of quality, it can only reasonably be applied to weekly publications, owing to the time taken to produce the plates For example, to obtain eight to twelve sets of plates for a daily paper in the time usually allowed would be practically impossible by the "Dalziel" process Nevertheless, the results obtained by this system are excellent, and for the purpose of printing illustrated newspapers may be said to be superior to electro plates as the conditions give better impressions.

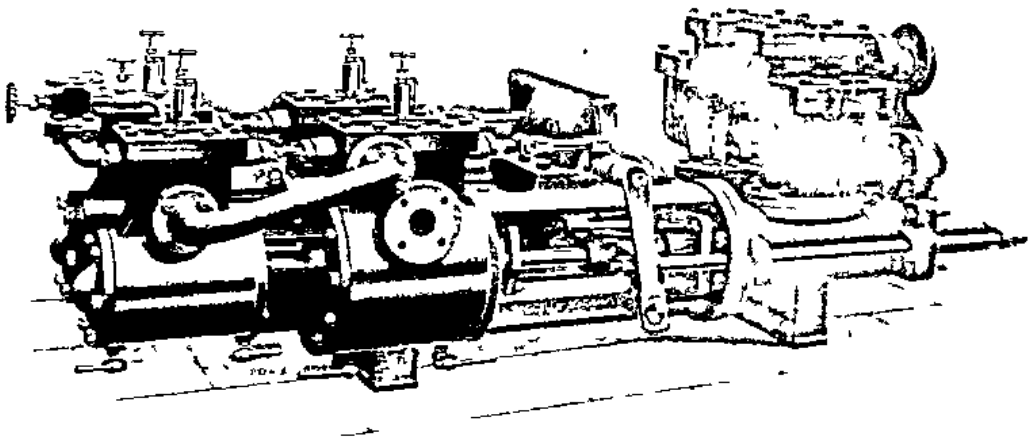
The latest methods which have caused such a remarkable difference in the printing of morning newspapers in London, are the "Nickello" and the "Longley" systems. It is now possible for duplicate plates to be made with great rapidity, so that late events of the previous evening are given to readers of newspapers the next morning. This has only become possible during recent years owing to the difficulties in the making of suitable plates having been overcome by the invention of the above processes.

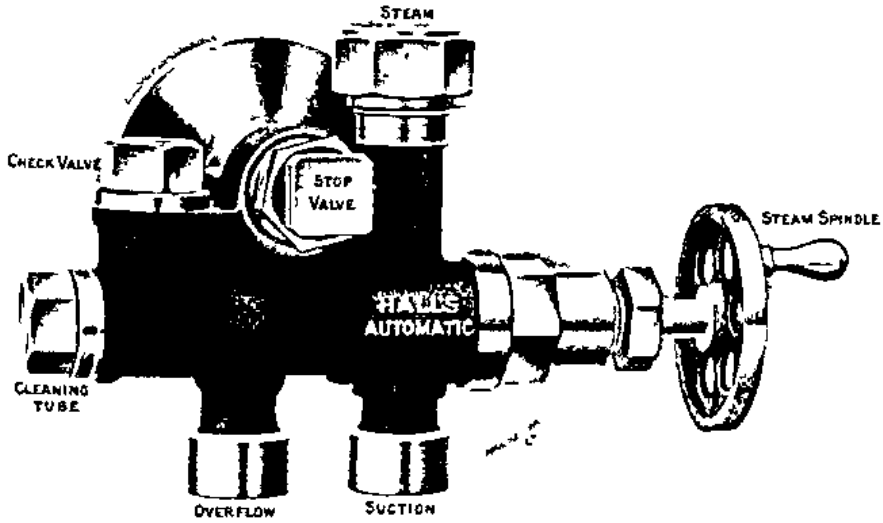
At the present time a number of stereotypers in London have a special way of applying the above methods for the production of half-tone and line illustrations suitable for morning and evening newspapers, whereby large pages can be duplicated in from eight to ten minutes, with certain degrees of success, owing to varying circumstances of ink, paper and machines.

The "Nickello," "Longley" and the so-called "Ivorite" systems may be summarised as being closely allied to one another, and which consists of facing the flong with a semi-fluid mixture which makes the mould and gives a surface and depth to stereotyped half-tones, such as until recently were unknown All these methods are capable of giving, in the hands of skilled operators, exceedingly good results, more especially when the plates are nickelled; as the nickel face gives a cleaner and better impression than the surface of the plain stereo metal. Another very useful method is the "Lignum Tissue" flong, the paper for which is supplied by Messrs. L. S. Dixon, of Liverpool The flong is made in the ordinary way, and the only precaution to be observed is the entire omission of French chalk.

All newspaper proprietors and publishers should look into this question of stereotyping and insist on the adoption of one of the systems mentioned in this article, as some of the advantages gained are as follows:—

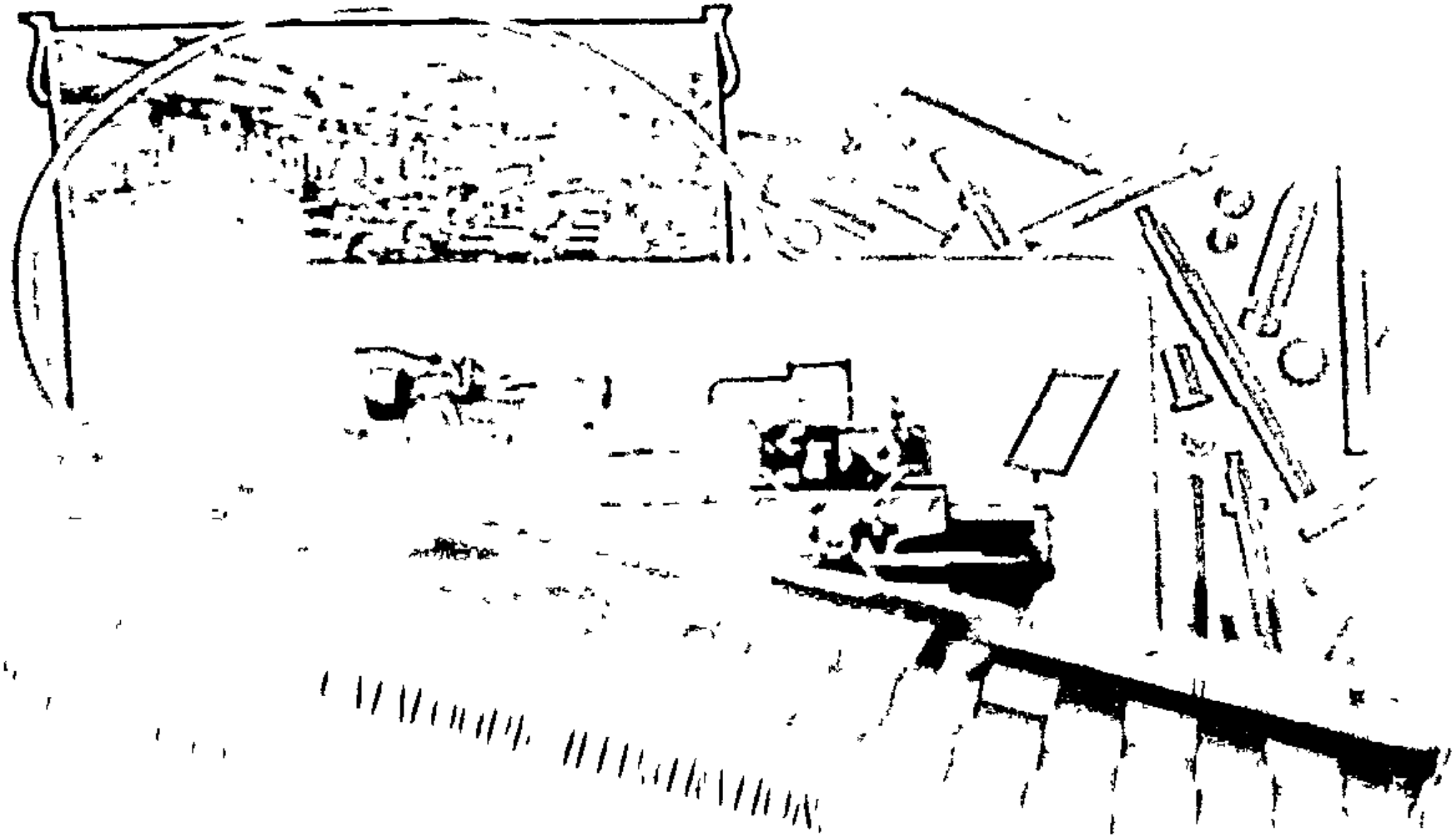
(1) It allows advertisers to use illustrations of a reasonably fine character, limited only by the quality of the paper used, thus enabling the revenue to be largely increased—an essential advantage to the making of a successful publication. (2) It allows the use of half-tones, chalk drawings and especially fine line illustrations. (3) The typographical portion of a paper is printed cleaner and better than when the ordinary chalk-faced mould is used.

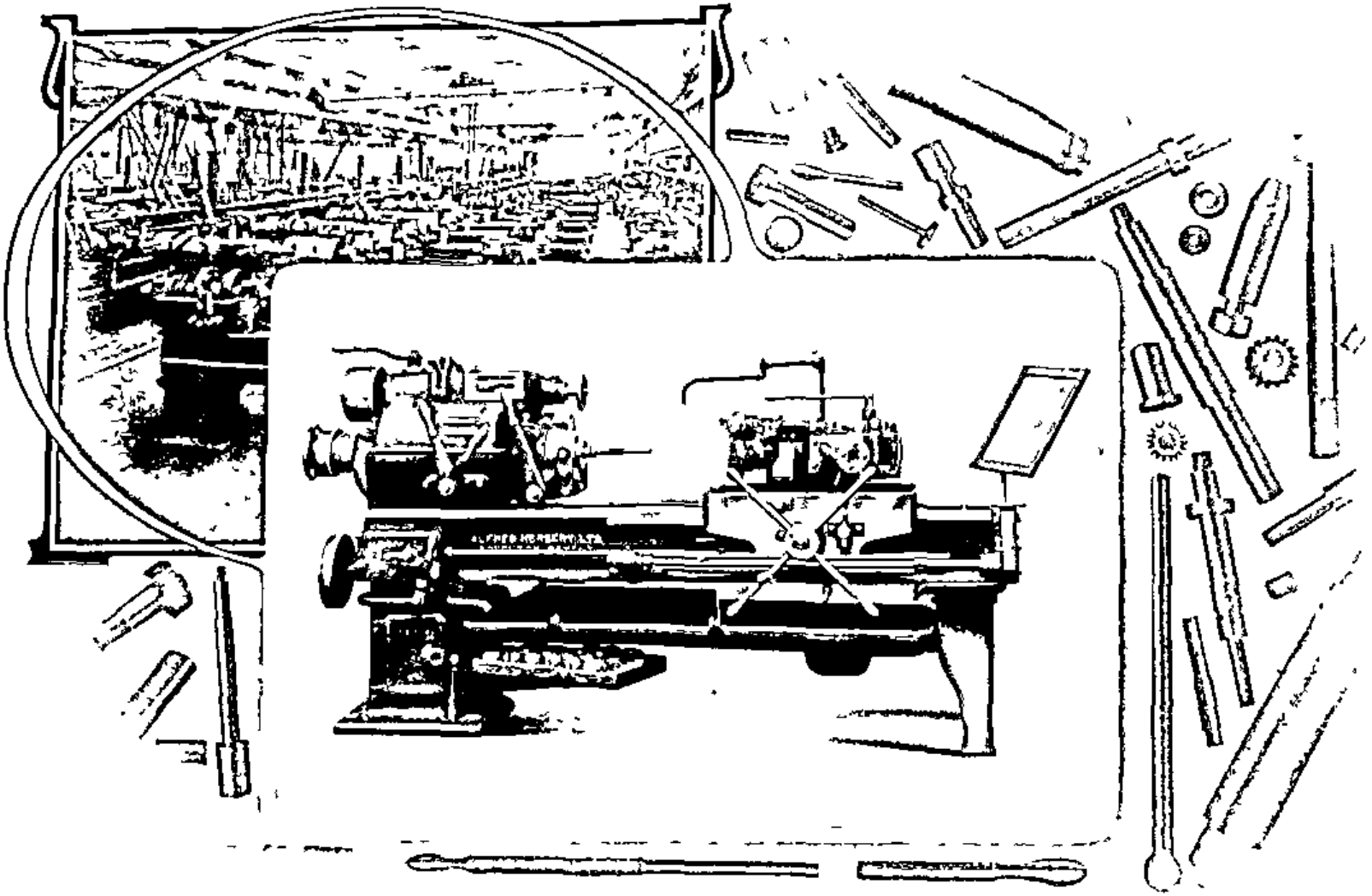




ENGINEERS' CATALOGUE ILLUSTRATIONS.

Drawings and Half Tones by
The Manchester Wood Engraving Co., Ltd

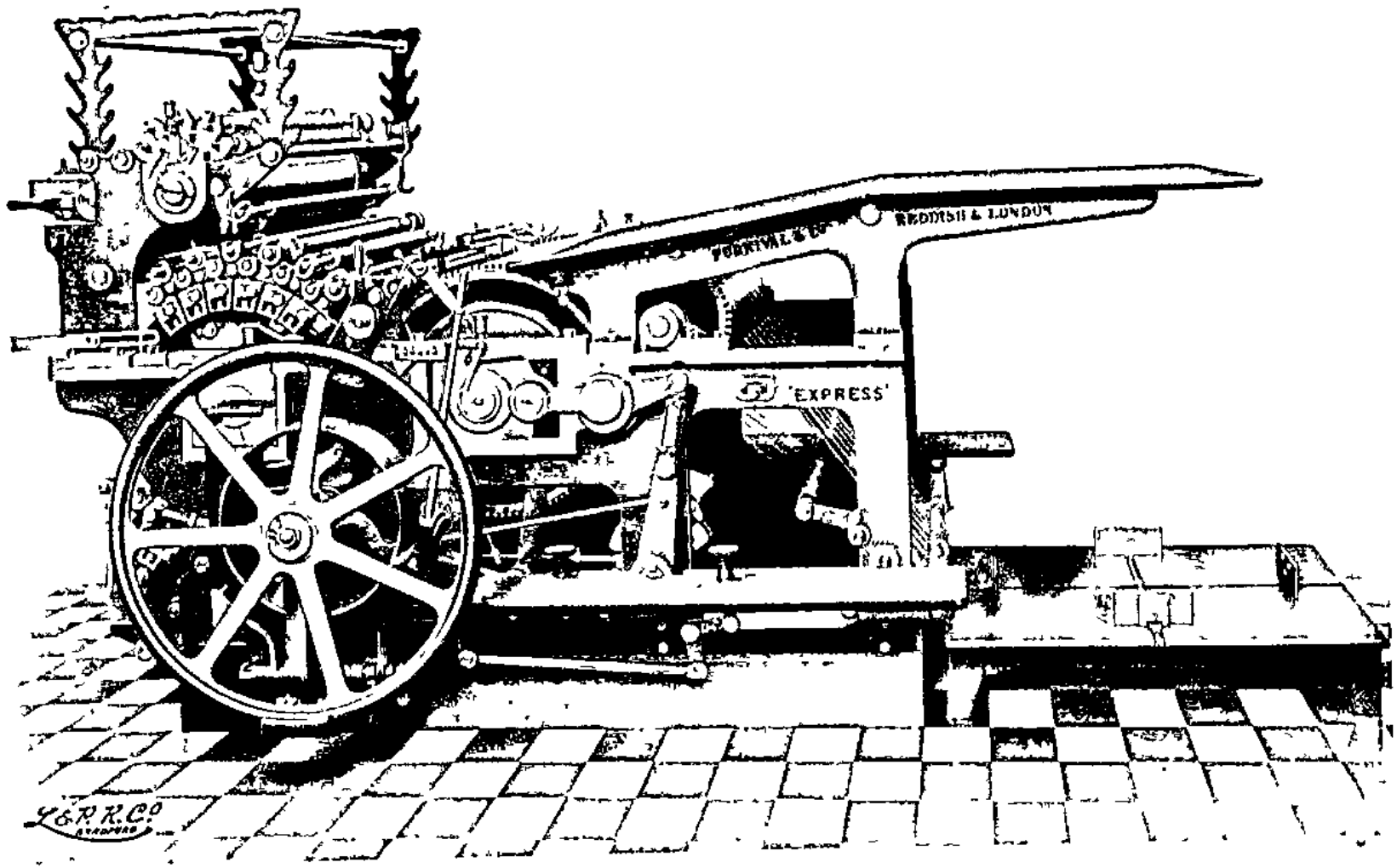




CATALOGUE ILLUSTRATION.

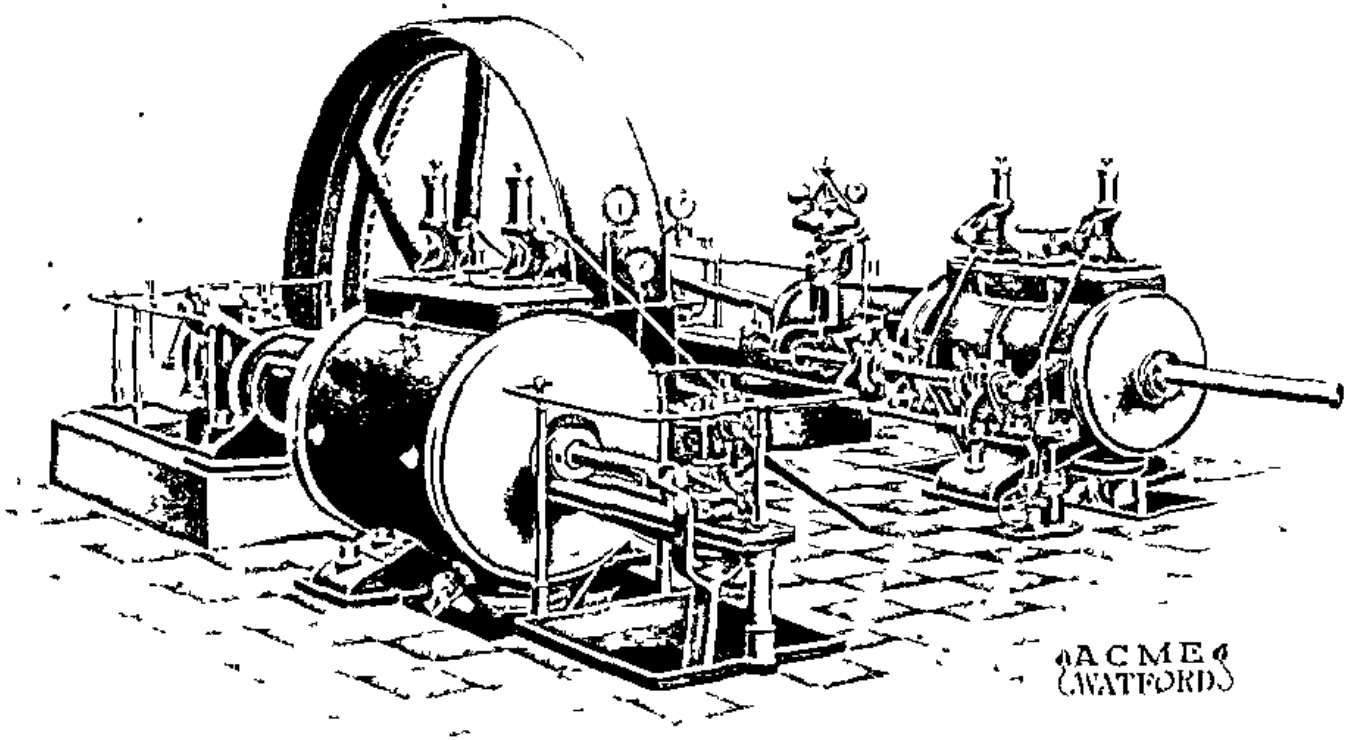
Block by
The Tone Photo Engraving Co, Birmingham

By kind permission of
Messrs Alfred Herbert Ltd.



CATALOGUE ILLUSTRATION.

Original and Block by
London and Provincial Reproduction Company,
Bradford



CATALOGUE ILLUSTRATION.

Original and Half Tone by
The Acme Tone Engraving Co., Ltd

Original worked up
from a woodcut

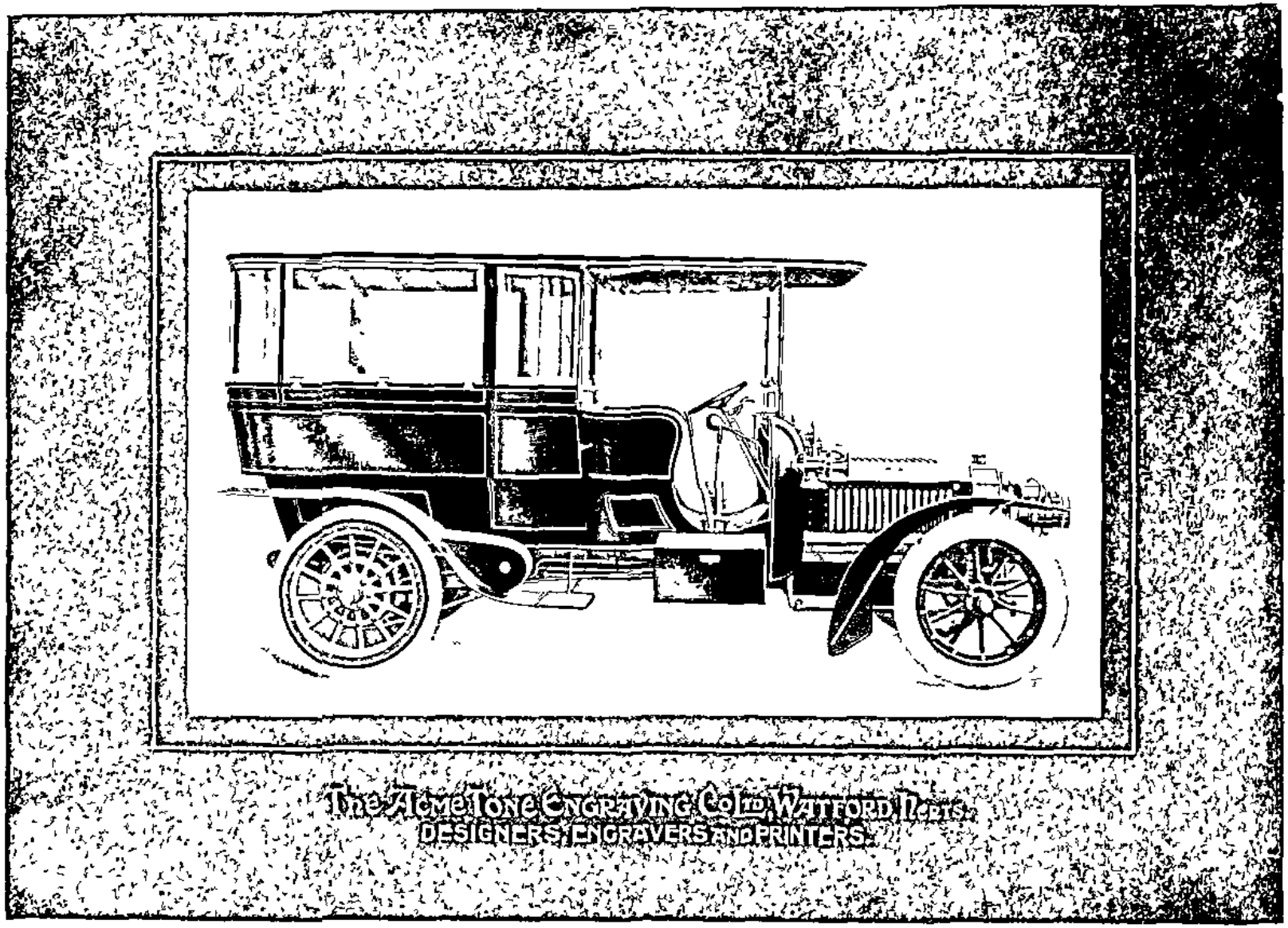


ALINARI

SOCIETÀ ROMANA
PER LA RIPRODUZIONI FOTOMECCANICHE
ED ARTI AFFINI
Via Flaminia 41ª
Telefono 3640 ROMA

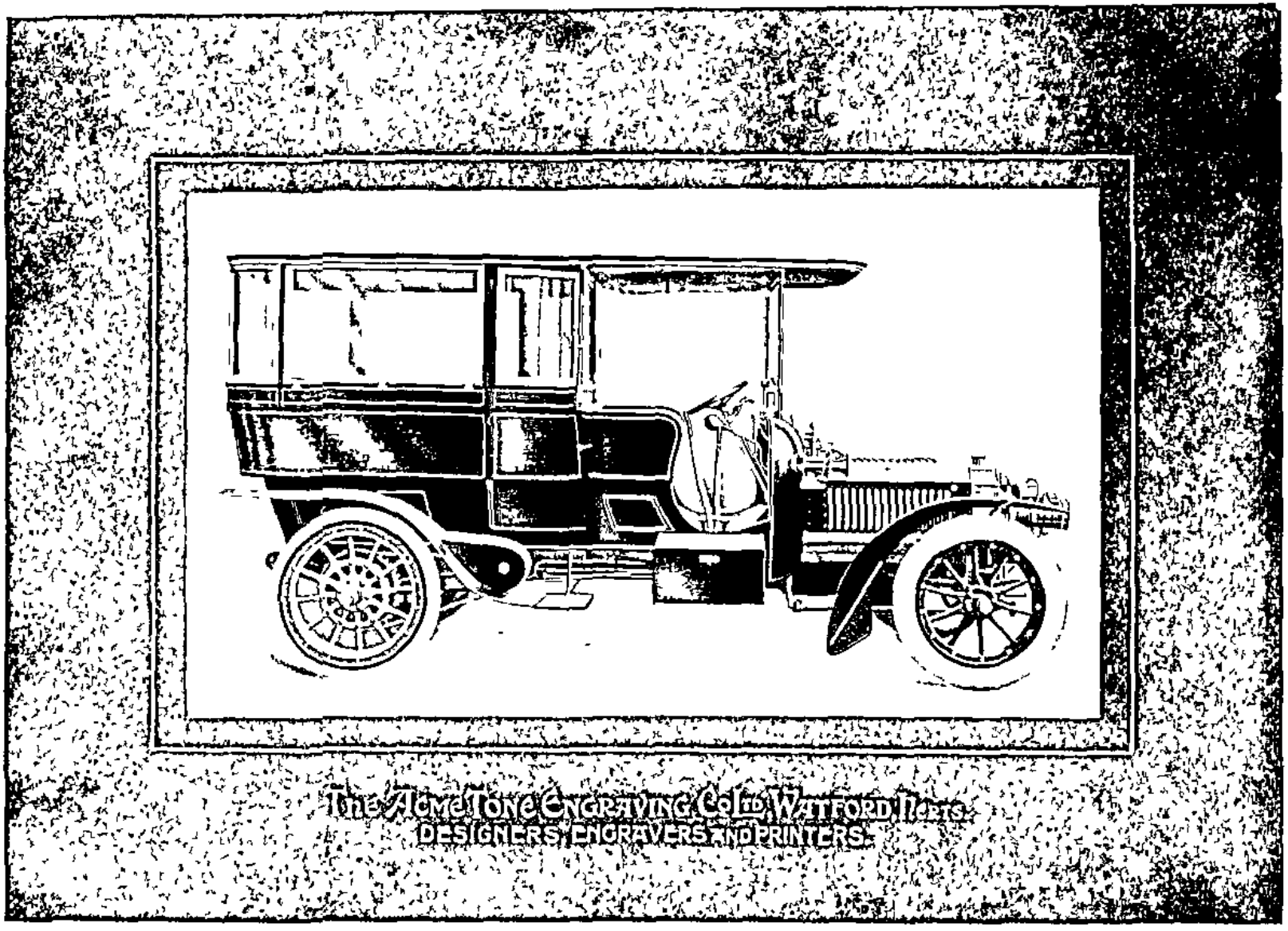
With compliments
and kindest regards
to the Editors Messrs
Penrose & C.°

Rom 1905

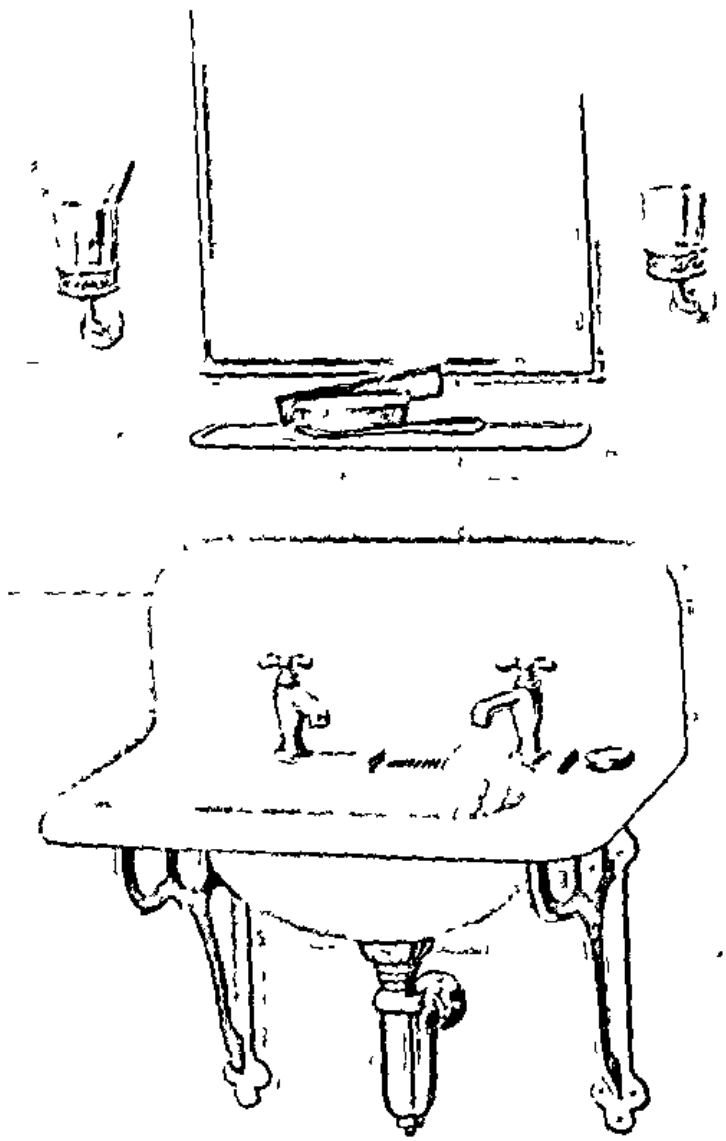


A HIGH-CLASS CATALOGUE ILLUSTRATION.

Half Tone by

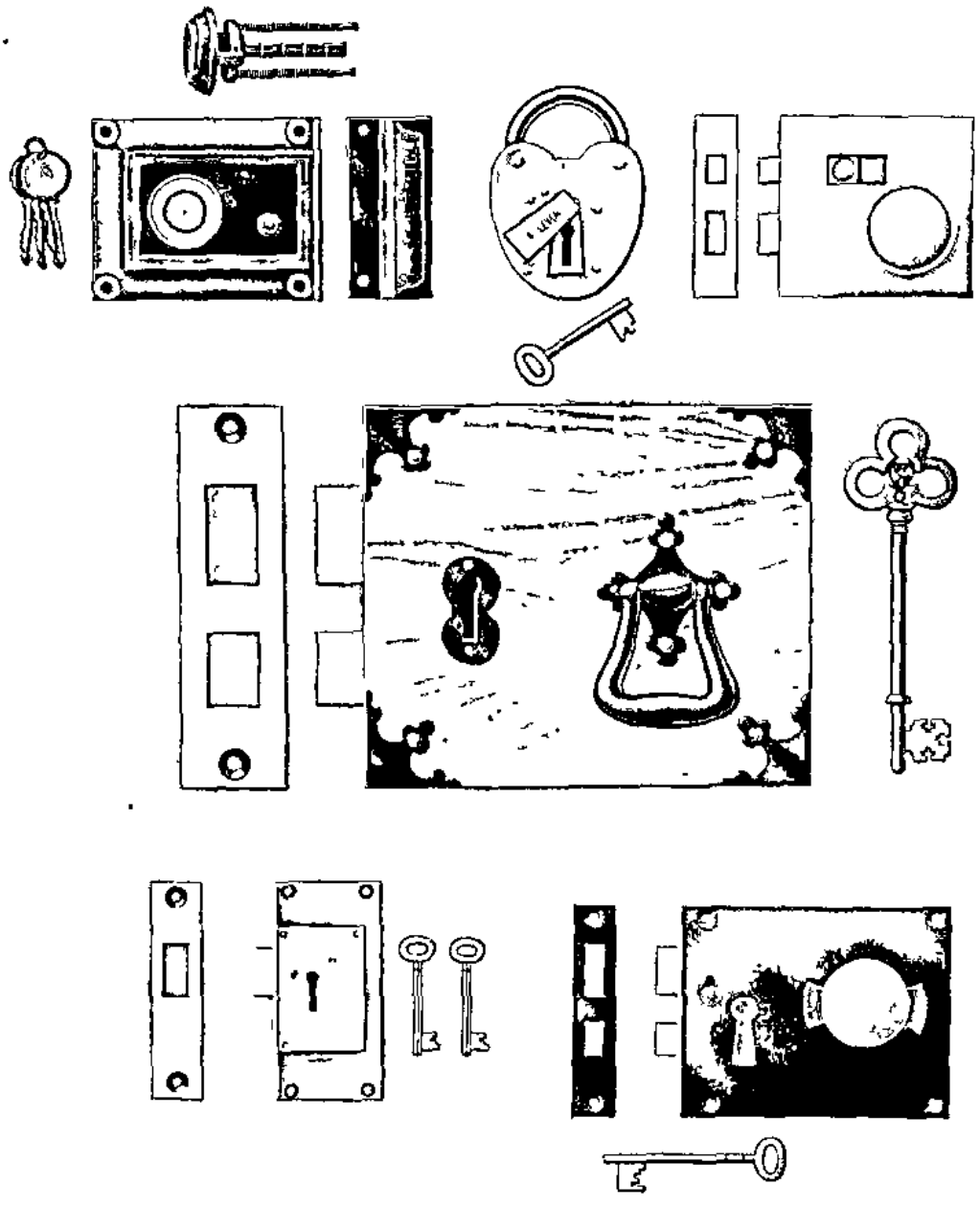


A HIGH-CLASS CATALOGUE ILLUSTRATION.



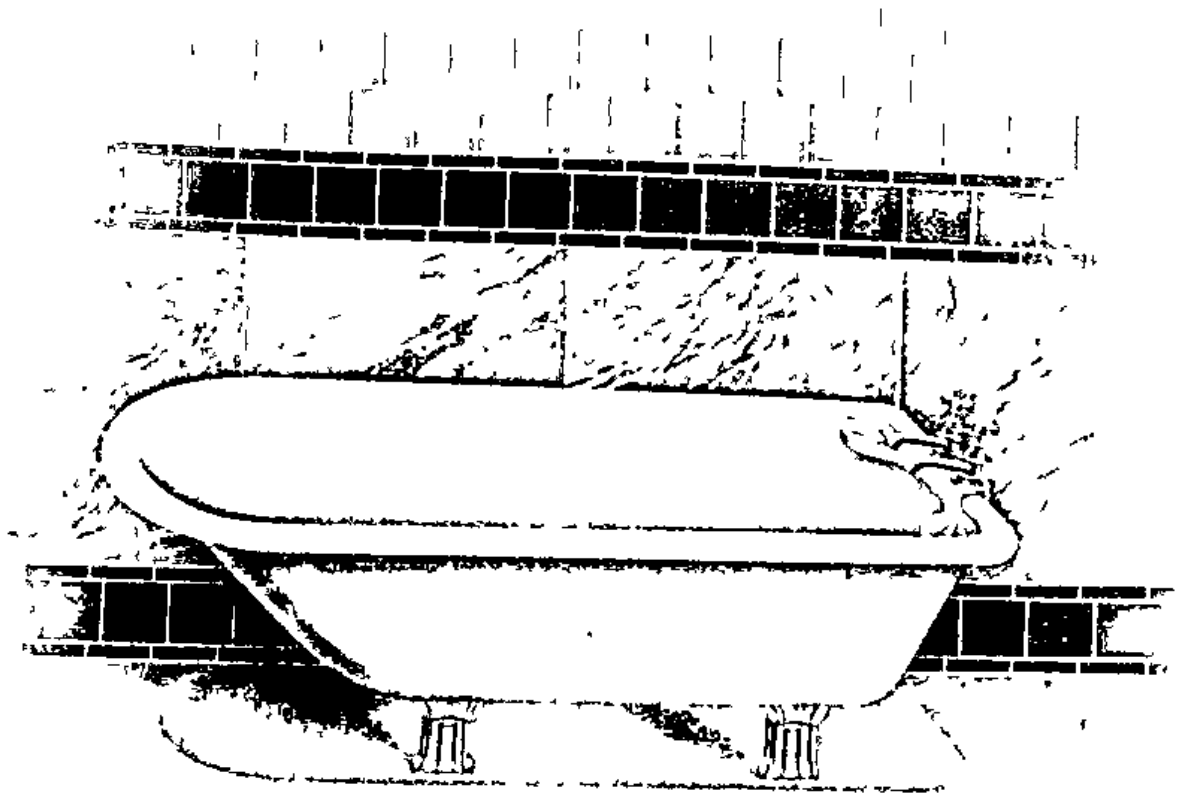
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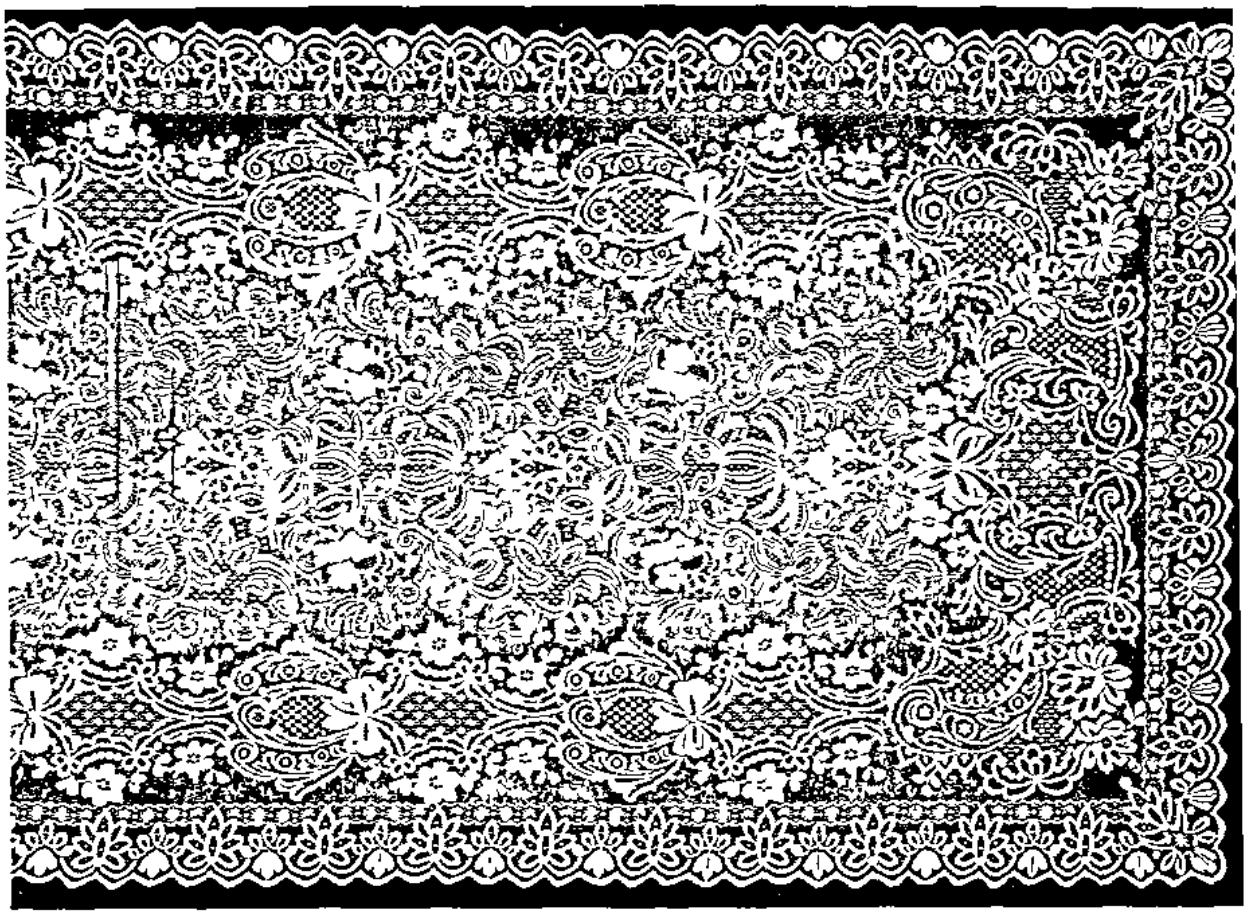
Drawing and Block by
The Press Etching Co

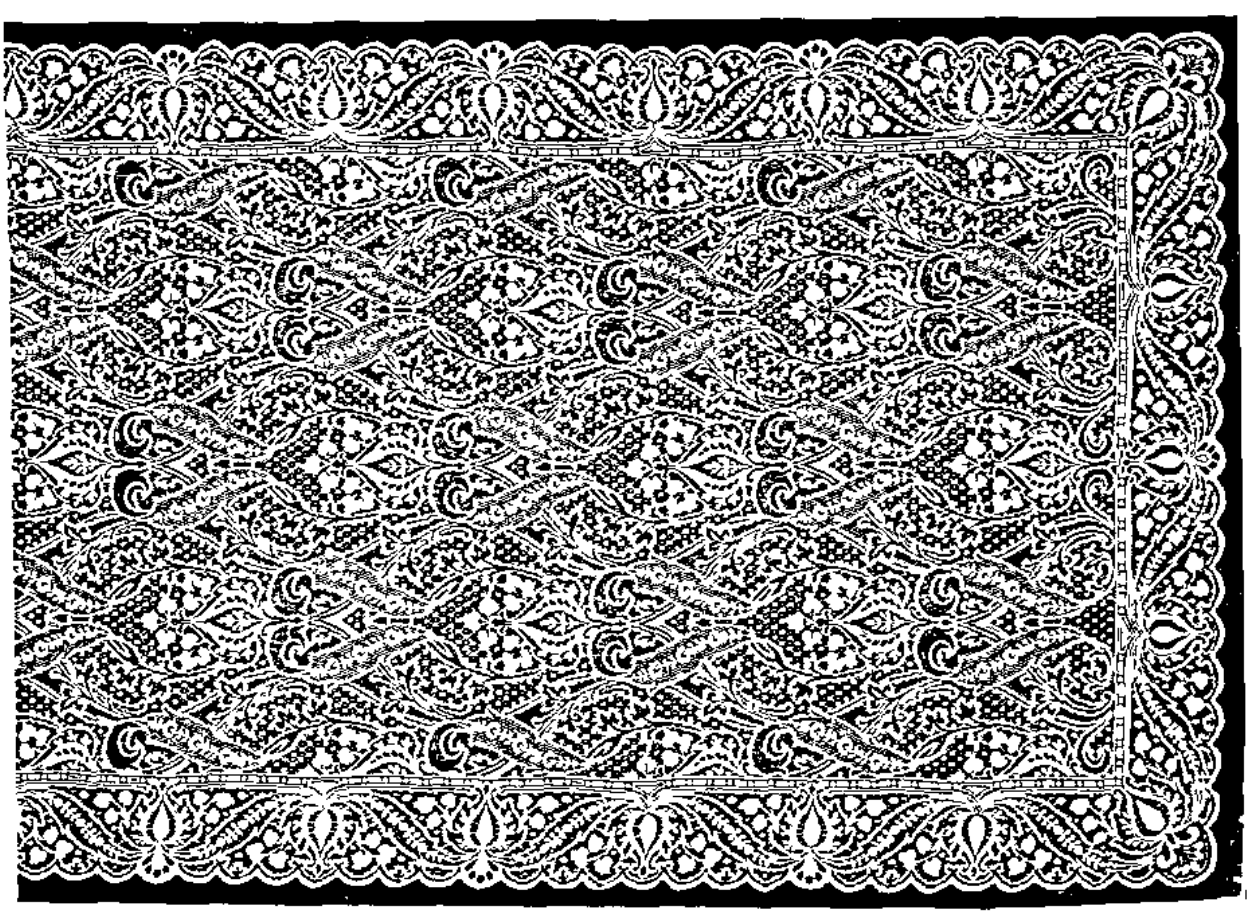


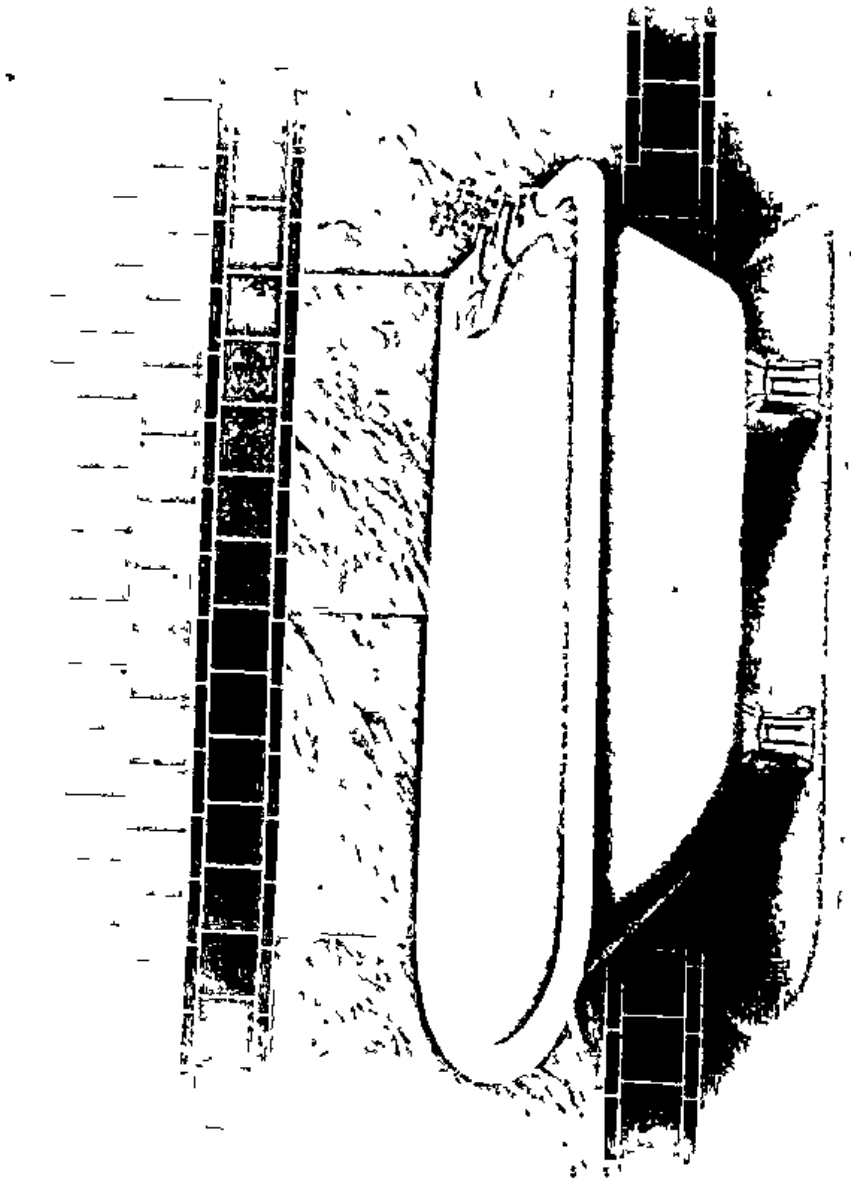
CATALOGUE ILLUSTRATION.

Drawing and Block by
The Press Etching Co









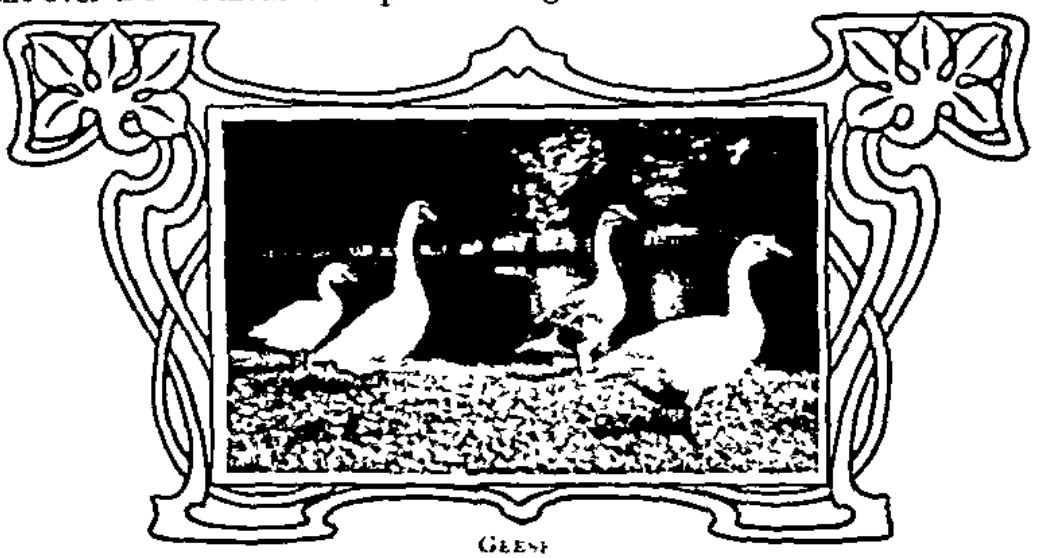
first exposure was made; the result was far beyond the expectations of the builders. One or two more trials convinced them that they had "struck it;" success was assured, since then "Sunlight Half-tones:" are the regular thing. each new and previously untried subject set before the lenses proving more convincingly than the last, the great superiority of this method. Not only is the result of the "direct" work a surprise, but the photographic copy or painting or drawing that is set before the camera and lighted by the direct sunlight instead of artificial light, produces under these conditions a half-tone negative that is distinguished by an even tone, a sharper detail, and produces a cleaner deeper etched half-tone, which will last almost as long again and is far easier to print.

By this method the commercial photograph is eliminated entirely—no retouching, no faking of any kind. The objects to be engraved are placed directly before the lens of the half-tone camera, and the half-tone screen negative is made direct from the object. The result is a half-tone plate that is practically perfect, clear and sharp in all detail; form and relative colour of all objects or parts reproduce perfectly, and, greatest of all, that indefinable quality known to artists as texture. This is retained in a manner truly wonderful.

Anything that can be placed before a camera is reproduced by this new method of making half-tone plates, with a convincing truthfulness of form, colour and texture that make the illustration by this process worth double the value of the old-style plate, as a selling force in catalogue work.

The half-tone plate of hand bags shown along with this article is a page of a catalogue such as is now being made by this company, and it shows what can be done for different lines of business. Notice the grain of leather in the various hand bags. The detail, character and quality of these goods are apparent at first glance.

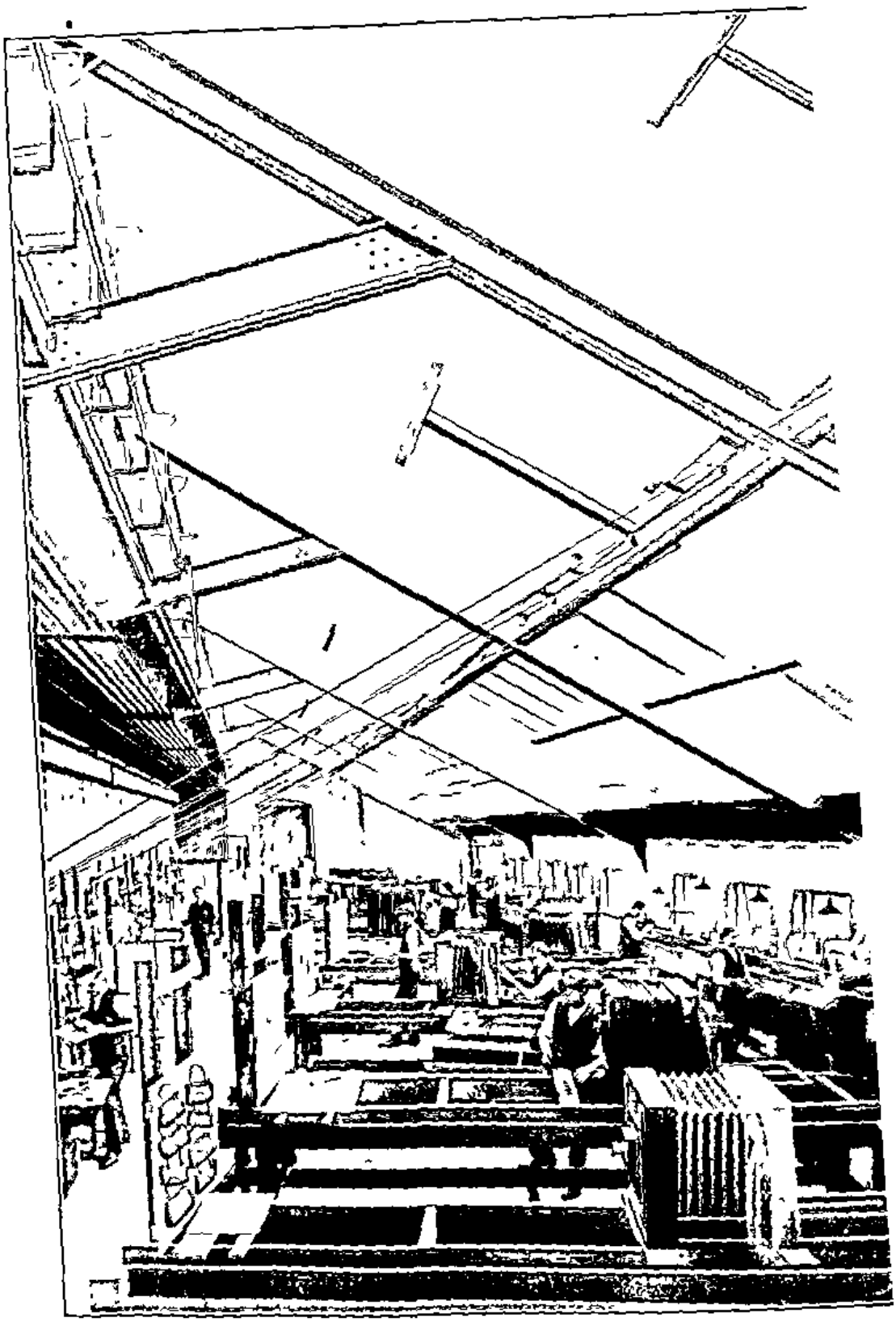
As to the question what particular class of goods can be properly shown by this method, I feel confident that everything that can be moved to a camera will be better illustrated by this method. Objects too bulky and heavy, where the camera must come to them, will also feel the wonderful effects of our Sunlight Skylight, as in making half-tone negatives from copies we use daylight instead of electric light; the result is a better, more even tone in the plate and from this negative we obtain a printing quality in the half-tone plate that is a vast improvement over the old methods of plate making.



GEESE

Half-Tone by
MANCHESTER WOOD ENGRAVING CO., LTD

Photograph by
C. G. ZANDER



THE FAMOUS SUNLIGHT SKYLIGHT OF THE BINNER WELLS CO., CHICAGO.


DRAGONFLIES by FRANTZ
Sample of MONOCHROME work
by W.F. SEDGWICK L

VELOGRAPHY.

By FRANK COLEBROOK.



Design and Block by ARCHIBALD & FOWLER

VELOCIPEDE we know And now we have "Velography" Swift "writing" by etymology; swift reproduction by commercial acceptance.

It is given to the world by Messrs. Norton & Gregory, of Castle Lane, Westminster, who once before were mentioned in the YEAR BOOK. On that occasion it was in connection with a new process they had invented for black on white photo printing.

This firm's latest invention, "Velography," is not photo-lithography, is not photo printing, and is not "process" as the term is commonly used It is something of all three. It is photographic for a start, but the camera application is by certain methods new to the photo printing world, and probably unfamiliar to ninety-nine professional photographers out of a hundred An extremely rapid photo print having been secured, a negative of a sort is transferred. "What onto?" as our Editor will perhaps put it, now that he's been to the United States and learnt word compounding. "Onto"—ah, but there the inventors hold my hand. That medium receiving the transfer is the essence of a process It is not stone; it is not aluminium; it is not zinc; it is not a number of other things The business point is that it is a medium which promotes very quick work. The other day an architect sent in a large plan, black and white. In twenty minutes his messenger was able to take away the two duplicates he needed.

These photo printers and certain others, who have to do work along this line, are also busy at times in photo printing on paper or linen of almost any length. But that is another subject, and cannot be more than alluded to now.

By the way, Dick Turpin, according to tradition, occupied a cave at the back of the Old Stag Inn, in Castle Lane, acquired and demolished—the inn, not the cave—and replaced, by a fine building by Messrs. Norton & Gregory. There is some fitness of things in all this. Turpin predated the earliest use of Assyrian asphalte or bichromate of potash. But he was himself very sensitive to light. He produced plans very quickly. He was quite familiar with the negative as a first stage of his operations; from that negative he soon produced the satisfactory opposite. Poor old Dick! Don't you wish he were here again in the flesh, armed with his persuasive air and implements, and that he was commercial travelling for you. You'd get him to call on some people pretty quickly. "Order, or your life." However, he is dead—"still dead," as the man said to the forgetful, fussy body who year after year asked him how his old father was, a father some years deceased. Turpin is still dead, but his energetic spirit inhabiting the cave was taken over with the inn and its premises and appurtenances by these photo printers.

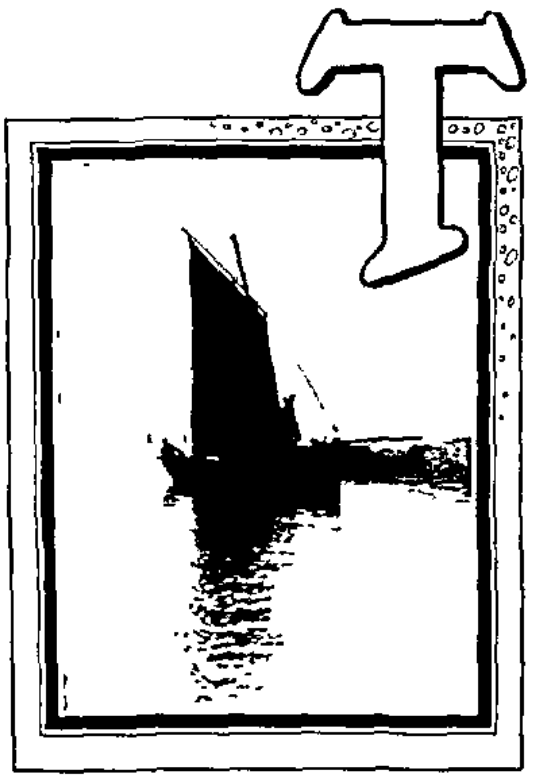


A SINOP COLLOTYPE.

Printed four on a sheet from plate prepared with Sinop Emulsion and

SINOP COLLOTYPE AND ITS APPLICATIONS TO MECHANICAL PRINTING.

By ALEXANDRE HENRIOT, Rheims.
(TRANSLATED BY THE EDITOR).



Photograph by D. Kennedy.

THE present article is suggested to us by reading the different interesting notices in the YEAR BOOK of 1905-6 touching on the processes of collotype, photo-lithography, etc., and signalizing the efforts to produce various surfaces for obtaining impressions in half-tone, such as on stone and on zinc, without the aid of a screen, and for avoiding the inconveniences which until now have encumbered collotype.

We have ourselves made numerous trials with the object of making use of the apparent grain which is presented by a collotype print, in order to obtain a typographic block on a lithographic transfer. The question is always before us, and we think we may be able to be of use to any who might be attracted by this problem by submitting to them the result of our personal experience.

Experimenters in this direction have not studied attentively enough the collotype plate, because if at the first sight one distinguishes on the print a kind of grain or of points more or less fine, a closer examination by means of a microscope proves at once that no grain exists, but only little sinuous tails of a vermiform character, more or less pronounced and very regular. These tails are most pronounced in the shadows; they are less and less in proportion as they correspond to the lightest parts of the picture, becoming completely null in the high-lights.

The collotype plate is not constituted by these points, but, on the contrary, by the tails, regularly spaced and more or less pronounced, the form of the image obtained on the plate being accordingly produced by the inked parts more or less separated, and giving an effect of transparency to the ink.

One conceives that such an image cannot be transferred to stone. The too light half-tones do not resist, or if they resist, they are sticky and after a little time become as black as the shadows.

As a consequence in all experiments of this kind, whatever skill may have been used in inking the transfer, the printing always gives negative results.

In the process of typography and lithography the ink is always deposited in its full intensity, and the half-tones can only be interpreted by lines, points or grain, more or less coarse, and more or less close together.

The transfer to a typographic block which is certain cases might be interesting

has not, we think, given good results; notwithstanding this it is logical and ought to succeed, so long as the transfer of the collotype print is in a contrary sense.

After we have thoroughly seen the inutility of our efforts in this direction we return again to collotype, in saying that it might perhaps be easy to bring about this process, the most beautiful of all, to be as rapid and as practical as typography or lithography, so as to give to these latter the artistic qualities of collotype. Our efforts in this sense have been crowned with success.

If collotype with our Sinop emulsion does not yet reach the speed of typography in its ordinary applications it obtains, and even surpasses often, that of lithography, preserving nevertheless all the qualities that give its charm

This possible rapidity of collotype printing is not the principal solution to be sought for This progress has been acquired, and duly and incontestably proved , we have added to it a greater regularity of impressions

The perfecting of the collotype process brought about by the Sinop emulsion may be summed up as follows —

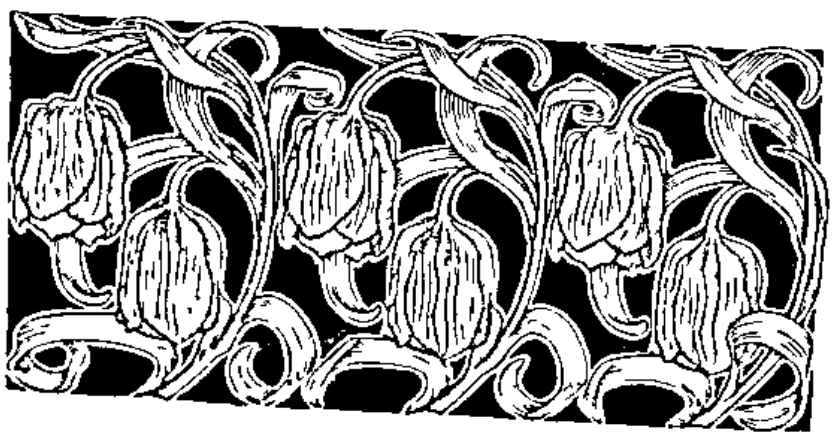
1. A greater sensitiveness to light, which is advantageous particularly in the bad season
2. A greater affinity for ink which permits the omission of the double inking, and of making the medium speed of 600 copies per hour.
3. The Sinop emulsion is more sensible to damping and preserves better and for a longer time its hygroscopic qualities.

In a quite recent experience on a little hand machine, it has been possible to print 2000 copies from the same plate without stopping once for damping. This result may evidently be obtained on a larger machine.

The omission of the double inking induced us to make a trial to print collotype on a typographic machine.

The experiment was perfectly successful, and demonstrated in an indisputable way the possibility of adapting collotype to lithographic machines by adding to them a bed to support the plate, and by replacing two or three rollers of leather by the same number of composition rollers.

These three factors : simplicity of the machine, speed and regularity will have, we think, a considerable influence on the popularising of collotype in all printing offices ; and if we consider that this process, which translates in such a perfect fashion the most delicate modelling, reproducing also with a remarkable purity and finish the finest details, one must admit that it becomes applicable to a multitude of purposes, that its field of exploitation, not at all limited even now, becomes at once extremely wide by the lowering of its price to the utmost, and instead of being only a speciality, an exception, it will be the indispensable complement to every well-organized printing office.



Design and Block by Students of the Bolt Court Technical School

THE PRICE QUESTION IN PHOTO-ENGRAVING.

By GEO. H. BENEDICT, Chicago.



Design and Block by ARCHIBALD & FOWLER.

NCE on a time, perhaps thirty or forty years ago, someone guessed that engravings were worth or could be sold at so much per square inch. It was a guess then, and has kept all photo-engravers guessing ever since.

One of the theories of the photo-engraving craft is that a good photographer can and should make from ten medium to twenty of the smallest, and an average of fifteen negatives per day, and that the crew that make up the force of etchers, finishers, blockers, proofers, etc., to complete the cuts, can keep up with the photographers regardless of the size of the negatives or cuts.

The smallest negative or cut considered is 2½×4 inches, containing ten square inches. A medium negative is any size up to 8×10 inches; therefore, twenty ten-inch negatives and cuts, or 200 square inches, is a good day's work, and ten 8×10 negatives and cuts, or 800 square inches, is no more than a good day's work, with the output in intermediate sizes in equal proportions, the only difference in the cost of a day's work being the cost of the material used.

This being the case, it is obvious that there is no square inch rate or so much per cut basis of figuring the cost, or a consistent selling price for half-tones, but a combination of a square inch rate to cover the cost of material plus a fixed charge per cut to cover the cost of labour, will give a close approximation of the cost and a reasonable basis for a selling price.

An example. The material used in making four 2½×4 cuts is no less than will be required to make one cut 6×9, containing 54 square inches, face measure, from one subject, which charged at 15c. (7½d.) per square inch is $8.10 (33s. 9d.), which is $2.10 (8s. 9d.) more than for four 2½×4 inch cuts at $1.50 (6s. 3d.) each, although one negative is made instead of four, one stripping and print, one etching and re-etching, one bevelling, blocking and trimming, and one proof; and if the four 10-inch cuts are for different customers there are four bills instead of one, likewise four packages to deliver or four shipments and four collections, etc., etc.

It would seem consistent that $8.10 (33s. 9d.) is either an unreasonable charge for a 6×9 half-tone, or $1.50 (6s. 3d.) is too little for a 2½×4 half-tone. As a further evidence of the absurdity of the square inch rate, consider the difference in two orders, one for a dozen 6×9 cuts, the other for two dozen 2½×4 cuts; one for 240 square inches, the other for 648 square inches, either of which can be turned out in the same number of hours. At the prevailing rate of 15c. (7½d.)

per square inch, twelve 6×9 cuts will cost $97.20 (£20 5s), and twenty-four 2½×4 cuts at $1.50 (6s. 3d.) each will cost $36.00 (£7 10s). The difference in the cost of the material used cannot exceed $25.00 (£5 4s. 2d), while the difference in the charge is $61.20 (£12 15s).

If there is any profit in 2½×4 inch cuts at $1.50 (6s. 3d.) each, the engraving business must be extremely profitable, if it is not, it is evident the profit on large cuts must go toward making up for the actual loss on small cuts

Every engraver has undoubtedly noticed that when he has had a month filled with orders for large half-tones, business was good and profitable

He has likewise noticed that when he has had a month of handling small half-tones, he has made nothing

Is it reasonable that with all hands busy his per cent of profit should be less on small than on large work?

If he keeps a record of shop costs and output, he has found as others have that—

Twenty-five per cent of the half-tones he makes are less than 2½×4 inches

Fifty per cent of the half-tones he makes are less than 4×5 inches

Ten per cent of an average cut is in the bevel, and face measure is a gift of ten per cent

He sells but little more than one-half the material he buys

If he is not making money, it is because he is giving the profit he is making on the large plates to the buyers of small cuts, and because—

He is dividing the profit on one-half his output with the customers that get the other half—dividing his profit with the half of his customers who do not contribute to that profit?



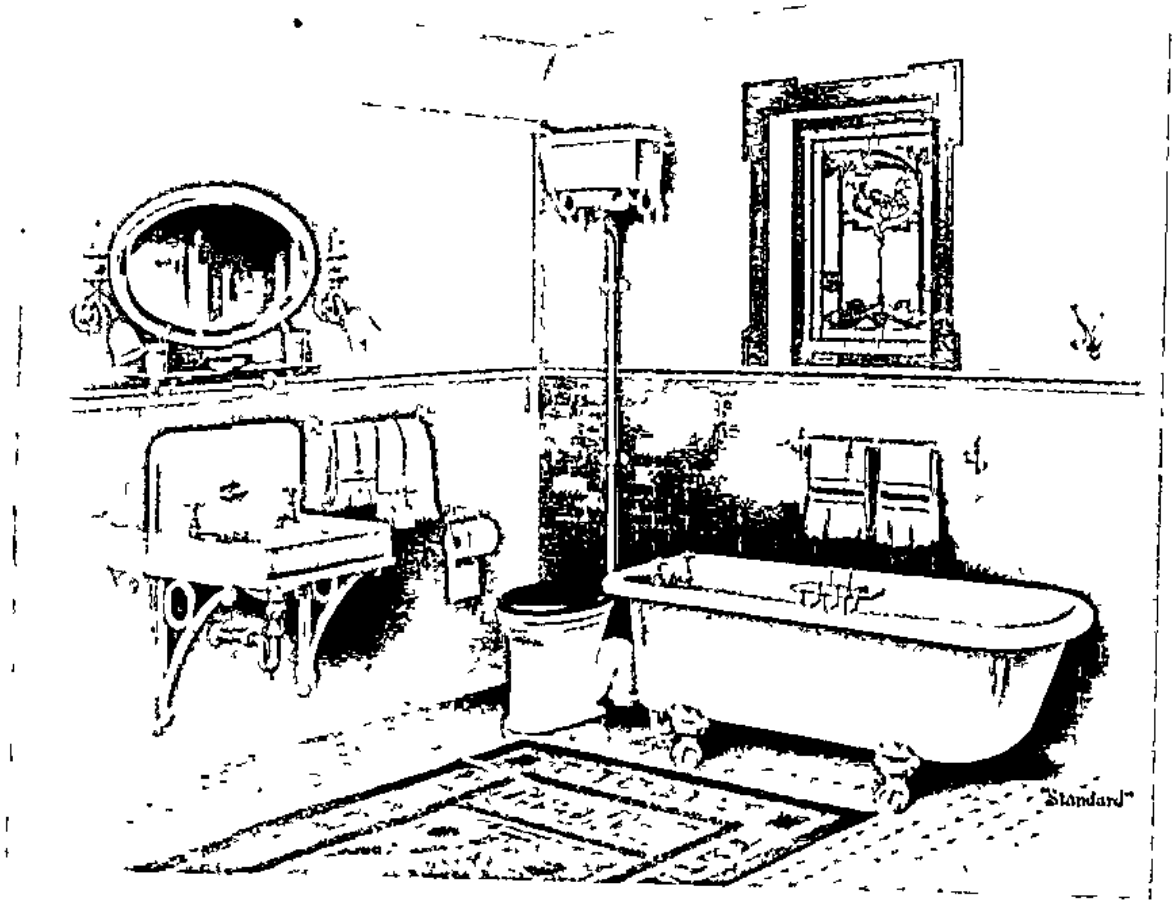
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A CHILIAN GANDER.

Half Tone Block by
Wallage & Gilbett.

Photograph and Drawing by
Henry G Walker



CATALOGUE ILLUSTRATION.

Drawing and Block by
Klobee & Franklin, Fleet Street

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CATALOGUE ILLUSTRATION.

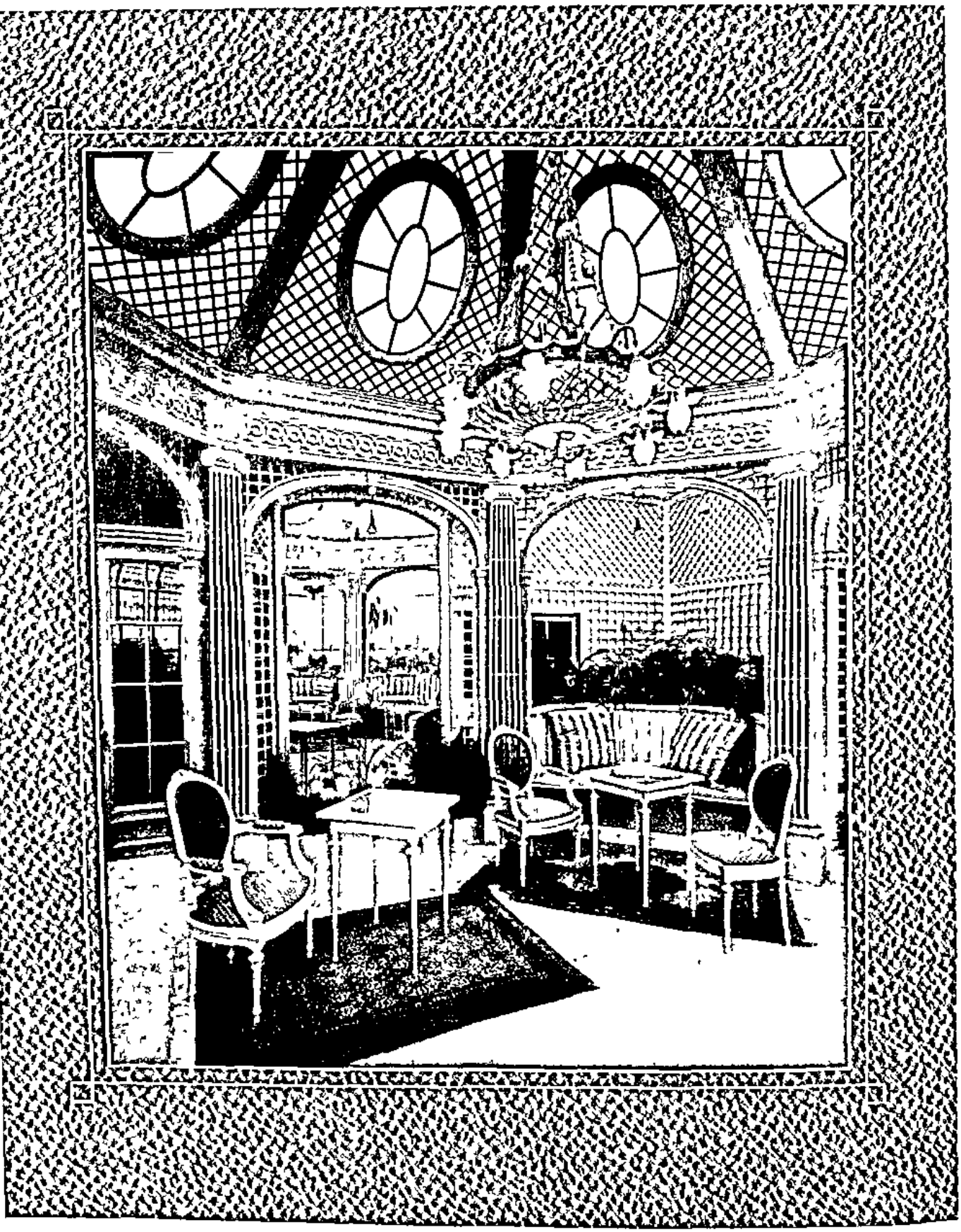
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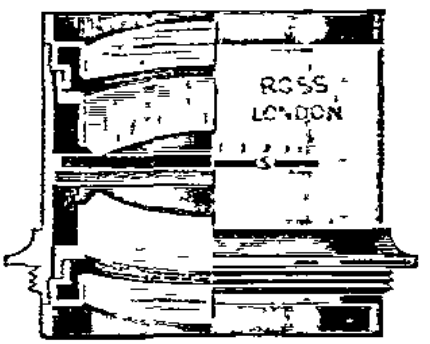
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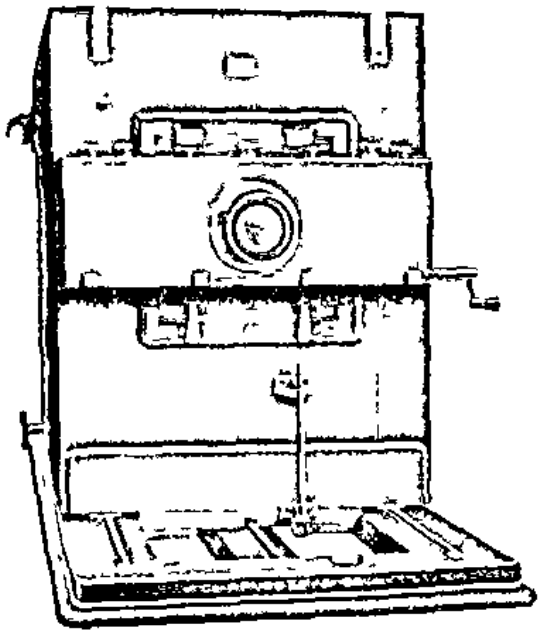
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With

Aluminium Sliding Screen Holder (Patented)

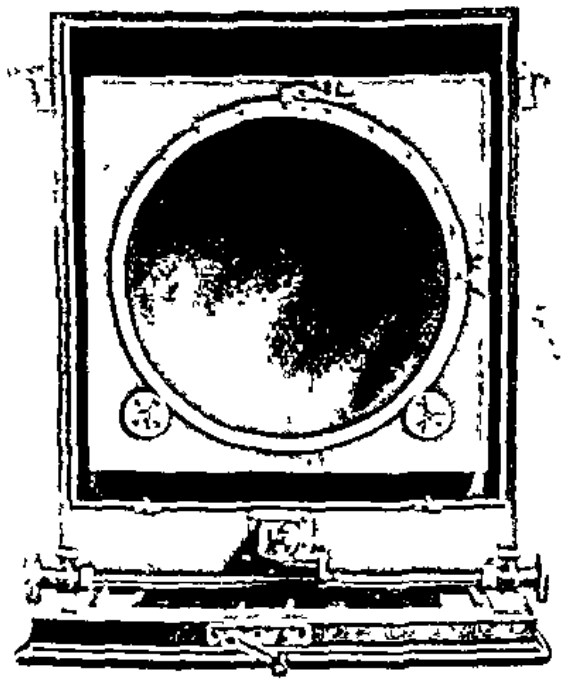
And

Max Levy's Rotary Screen Holder.

Besides the above special features for Colour Work this Camera has also the following

Advantages.

1. **Immense Rigidity.**
2. **Absolute Parellelism.**
3. **Fine Focussing** Mechanism for back front
4. **Locking Screws** for fixing focus
5. **Rising Front** operated from back
6. **Centric Screen Adjustment Gear.**
7. **Locked Screen Bars.**
8. **Pressure Spring,** keeping screens to front
9. **Iron and Aluminium Screen Gear.**
10. **Sloping Screen Indicator Plate.**



BACK OF CAMERA

PENROSE CAMERAS

have stood the test of nearly twelve years' practical work in the leading Process Studios throughout the world

A. W. PENROSE & CO., LTD.,

Camera Department. **109, Farringdon Road, London, E.C.**

Max Levy's Screens

Still remain the Standard.

Special Screens for Three-Colour Work:

The circular screen fitted in Levy's rotary aluminium holder, guarantees accuracy in duotype, three and four-colour work.

Economic Screens:

Ruled but not etched. Valuable for extra large sizes, special rulings, or for occasional use. Price one-half list on Engraved Screens.

Large Sizes:

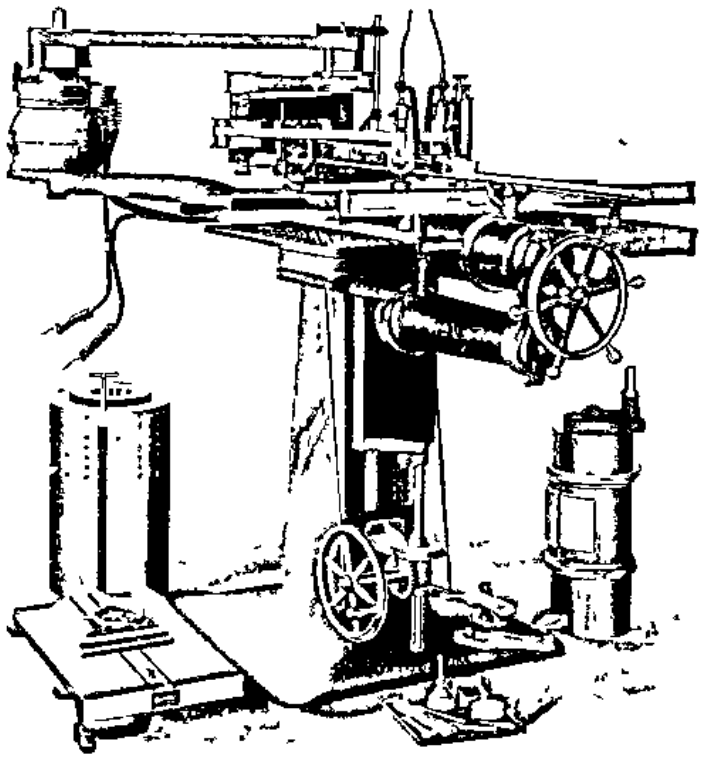
A new machine is completed, capable of ruling up to 72×72 inches.

MAX LEVY,

Wayne Avenue and Berkley Street, Wayne Junction,
PHILADELPHIA, Pa., U.S.A.

FOREIGN SELLING AGENTS:

ENGLAND. A. W. Penrose & Co., Ltd., London.
GERMANY & AUSTRIA: F. Hemsath, Frankfurt, a.M.
FRANCE. J. Vorin, Paris.
JAPAN: R. Konishi, Tokyo.
AUSTRALIA: Middows Brothers, Sydney.
SOUTH AMERICA: H. Stein, Buenos Ayres.



. . ROYLE . .

When you think of ROUTERS you naturally think of ROYLE, because for forty years the name has been associated with the machine, and the machine with the name. No Photo-Engraver ever doubts the efficiency of ROYLE ROUTERS. They are indisputably reliable, durable, speedy, and economical to use. The Sun never sets on ROYLE ROUTERS, for they are in use all over the World; Photo-Engravers of all nationalities conceding the superiority of these machines. The ROYLE BEVELLERS, SAWS, PLANERS, DRILLS, and other machines are equally good and as universally used.

JOHN ROYLE & SONS, Paterson, N.J., U.S.A.

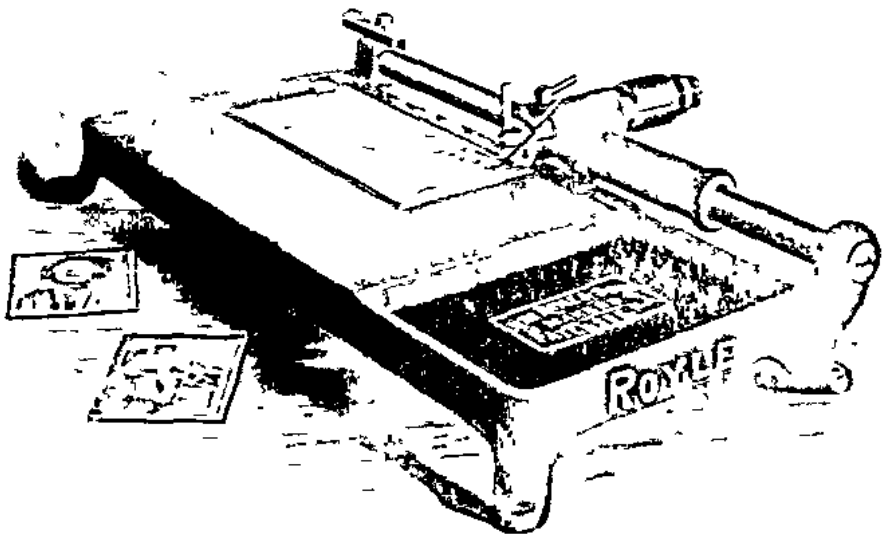
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A. W. PENROSE & Co., Ltd., 109, Farringdon Road, LONDON, E.C.

Royle's Latest Speciality.

A NEW TOOL

for the Photo-Engraver.



ROYLE'S BENCH LINER.

(Patents pending in the United States and other Countries)

This Machine is for making graved border lines on Half-Tone Plates. It is the simplest appliance yet invented for this purpose. No pulleys, belts, gears or other similar appliances for power driving. It is operated entirely by hand, so that the lining of plates need not be done in the machine room. Makes single, double, treble, or, in fact, any number of lines, any spacing, and with mitred corners.

Made by JOHN ROYLE & SONS, Paterson, N.J., U.S.A.

SOLE BRITISH AGENTS . . .

A. W. PENROSE & CO., Ltd., 109, Farringdon Road, London, E.C.

Hands Across the Sea

IN AMERICA...

New Ideas, going to make perfectness in the Photo-Engraving, the Electrotyping, the Stereotyping and Printing Crafts, are constantly being developed by the United Printing Machinery Company, of Boston, New York, and Chicago, U S A They have organized a department solely for this purpose No invention is allowed on the market until it is proved to be a success and an economy to the user The United Printing Machinery Co is the Sole Agent for the Penrose Company in America

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There is one Company whose name stands for progress and improvement in the plate-making trades above all others—**THE PENROSE COMPANY.** We are proud to announce that, as we are the Penrose Co.'s Sole Agent in America, carrying a complete line of their colour filters, spectroscopes, and the special apparatus that have made them famous, so they have agreed to be the United Printing Machinery Co 's **SPECIAL AGENT IN GREAT BRITAIN,** carrying such plate making apparatus of our manufacture that may be suited to the English Market. The convenience and benefit to the plate-maker is obvious, and we know will be appreciated.

Everything for the Electrotyper
Everything for the Photo-Engraver
Everything for the Stereotyper

Visit our stores, see the machines running on individual motors, and test them under working conditions. Bring your own plates and try them.

Write for our series of Economy Primers now publishing. Get your name on the list.

United Printing Machinery Co.

BOSTON:
246, Summer St.
NEW YORK:
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337, Dearborn St.
U S A.

Peerless Carbon Black

is used by all the leading British Printing Ink Makers in their Finest Inks for Half-Tone Printing and Fine Litho. Work.

WHY?

READ the following letters received from representative Printing Ink Makers.

When such Firms set the seal of their approval upon a certain Black it means something—it means that all Blacks obtainable have been tried and tested and that

PEERLESS

proved superior to all, and is the best for making HIGH-GRADE Printing Inks.

JOHN KIDD & Co., Ltd., 11, Wine Office Court, London, E.C.	"We have pleasure in stating that of all the Blacks we use, we consider 'PEERLESS' BLACK by far the most satisfactory for best halftone inks. We do not know any other Black which combines such depth of colour with easy-flowing characteristics, and the orders we have given you for this quality during the past few years are tangible evidence of our appreciation of its merits."
LORILLEUX & Co., 2, Maclean's Buildings, London, E.C.	"Having for many years used PEERLESS BLACK in some of the Inks made by us, we have pleasure in saying that we have obtained excellent results, and we beg to add our testimony to the numerous others which have already been addressed to you."
MANDER BROS., Wolverhampton.	"We have used your PEERLESS CARBON BLACK for the last 13 years for making the fine Black Ink which we supply to 'The British Printer,' and with which that Journal prints its fine Letterpress and Process work. We think we were the first in England to use your Black, and we consider that we, in a sense, 'discovered' it. We have much pleasure in adding that it has always been very reliable, and continues to give us the greatest satisfaction."
SHACKELL, EDWARDS & Co., Ltd., 3, Red Lion Passage, London, E.C.	"We have tested your PEERLESS CARBON BLACK against every other modern Black that has been offered to us, and we have pleasure in informing you that we consider it superior to any other for making those Letterpress and Process Black Printing Inks on which we stake our highest reputation. As proof of our satisfaction, we have, in the last few years, bought over 150,000 lbs. of your Black.
B. WINSTONE & Sons, Ltd., 100 & 101, Shoe Lane, London, E.C.	"It affords us much pleasure in adding our name to the ever-lengthening list of Printing Ink Makers who speak well of PEERLESS BLACK. We have used PEERLESS BLACK for more than ten years, and consider it by far the most superior we have yet examined for density, lustre, smooth working and general excellence. In conclusion, we beg to enclose herewith contract for supply of PEERLESS BLACK for 1903."

PRINTERS should therefore order INKS made from Peerless Carbon Black

From . .

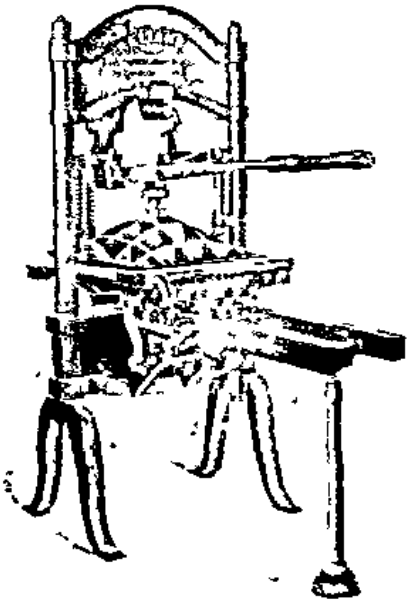
The Midget

to

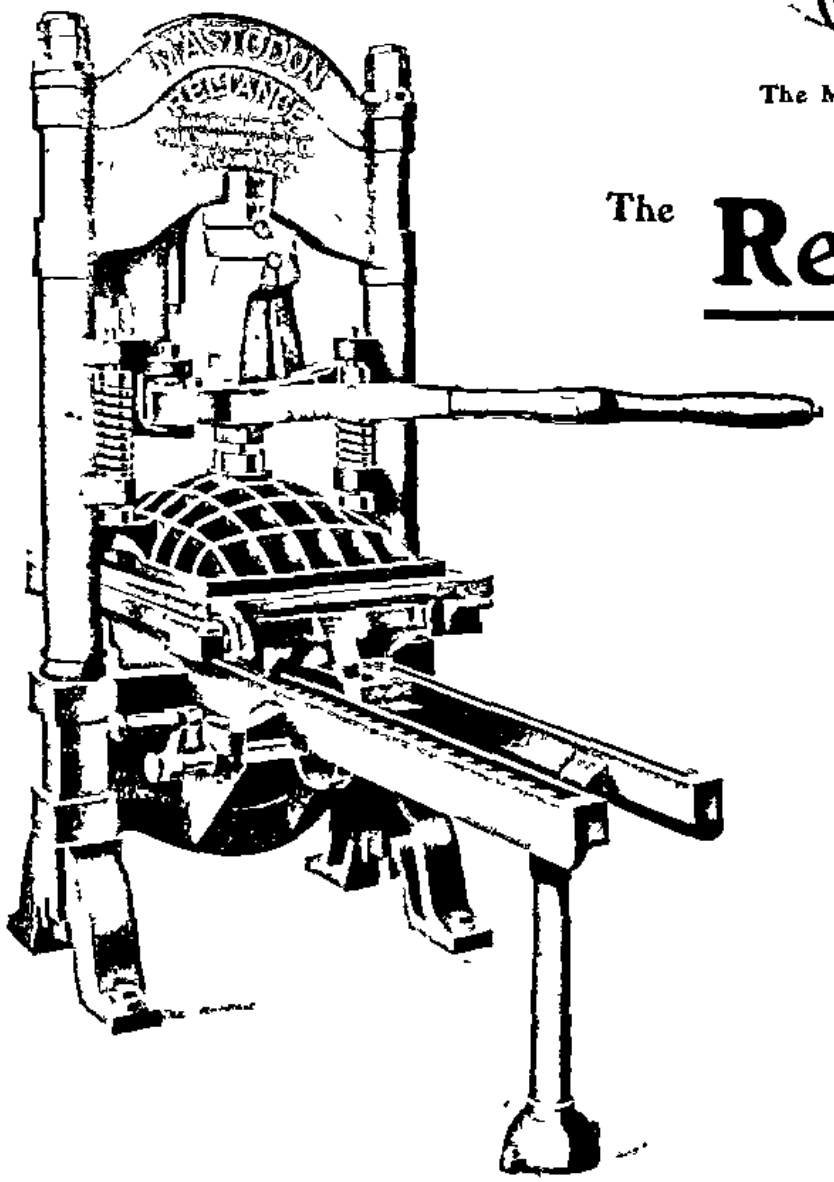
The Mastodon.

A FULL LINE OF
PHOTO-ENGRAVERS'
PROOF PRESSES

Of Gradually Increasing Strength
and Size to suit all requirements.



The Midget Proof Press.



The Mastodon Reliance.

The **Reliance**

has become

The Standard Press for Photo.-Engravers.

Unequalled for Strength and Accuracy.

Bed - -	28 × 40 in.
Platen -	25 × 36 in.

Manufactured by
Paul Schniedewend & Co.,
118-132,
West Jackson Boulevard,
Chicago.

SOLE BRITISH AGENTS:

A. W. Penrose & Co., Ltd., 109, Farringdon Road, LONDON, E.C.

THE

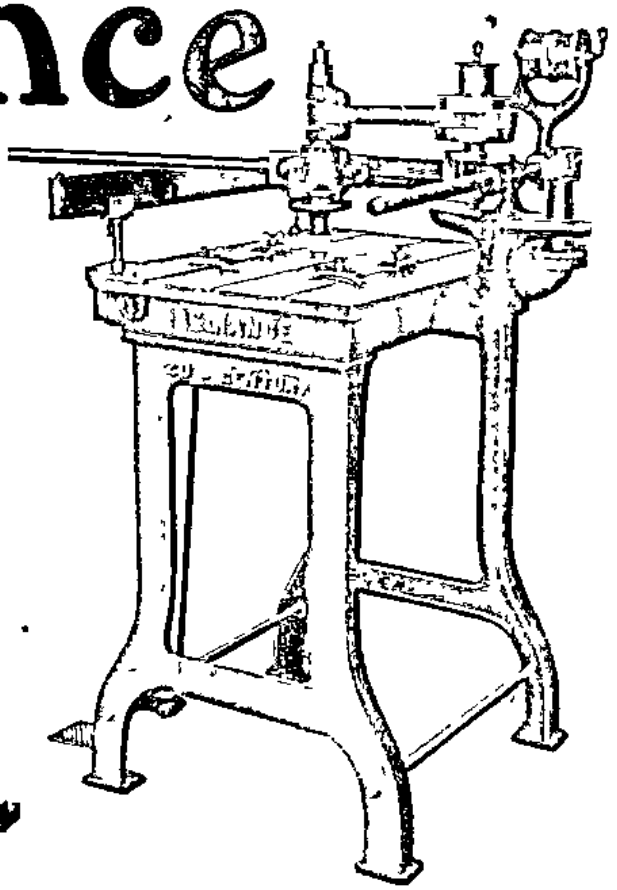
Reliance

Photo-Engraver's Machinery

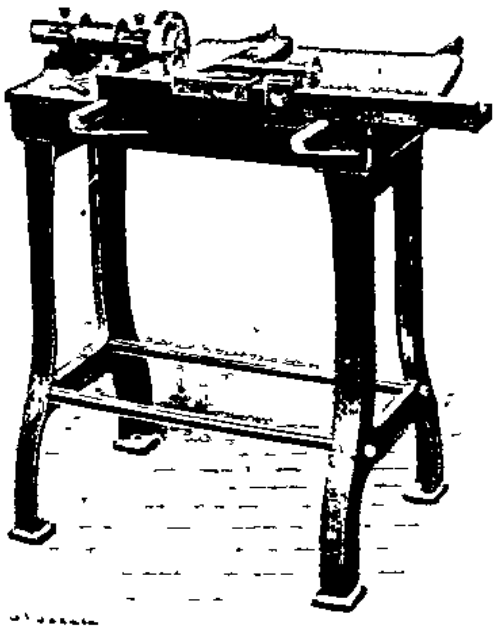
Has made a name

ALL OVER THE WORLD
FOR . . .

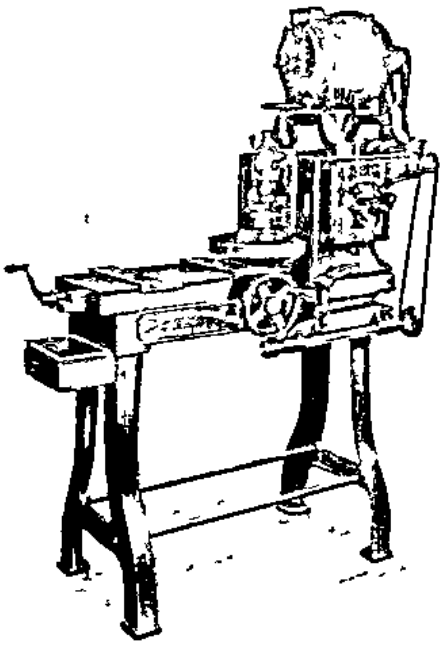
Its Practical Character,
Its Solidity, Durability,
Its Simplicity, and
Its Reasonable Price.



The 20th Century Reliance Router.
A very compact and light running machine



The Reliance Trimmer.
For making Blocks dead square, wood or metal
Made in three sizes.



Reliance Rotary Planer.
Planes wood or metal exact type height
Made in four sizes, with or without motor.

THESE MACHINES ARE ALWAYS TO BE SEEN RUNNING IN OUR SHOWROOMS

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CONTAINS NO ACID.

LE PAGE'S

Photo-Engraving Fish Glue. .



Extensively used throughout the United Kingdom, United States of America, and the Continent of Europe generally, for the production of - - -

HALF-TONE BLOCKS.

Specially Clarified for Process Work,
in Glass Bottles; Pints and Quarts

Also

Ordinary Grade, in Tin Cans, with Special Fastenings.

(Preferred by some workers who "clear" themselves).

Wholesale and Retail of—

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LE PAGE'S LIQUID FISH GLUE was awarded a

SILVER MEDAL AT THE PARIS EXHIBITION, 1900;
And a
GOLD MEDAL AT THE CRYSTAL PALACE EXHIBITION, 1902.

WELLS' "Lightning" Lime and Colour Washer.

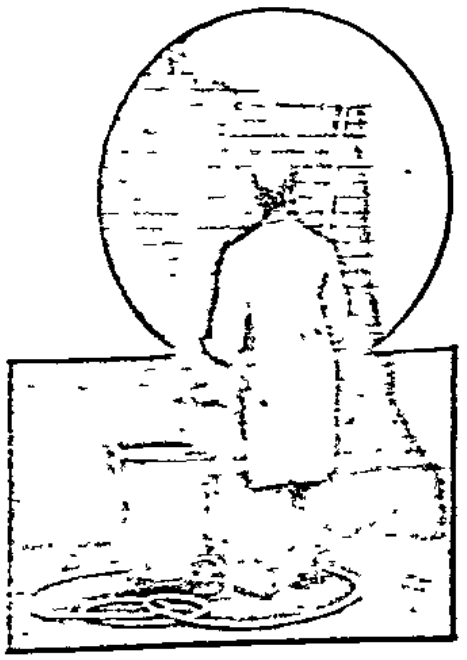
A GREAT SAVING IN TIME, LABOUR AND MONEY.

NO OUTSIDE POWER REQUIRED.

Lime, Whiting or Cold-Water Paints Applied at a speed of from 11 to 21 square yards per minute, in a manner superior to brush work.

One man with the Machine on rough surfaces will do Two applied with Brushes.

The Material is applied in the form of a spray, and is driven into corners and different places where a brush could not reach.



Will save First Cost in a few weeks.

No. 6a.—With [illegible] Fan	£5	15	0
No. 5.—[illegible] No. 5 and 6	7	7	0
No. 4.—With 5 ft. Flue, Single Spray or Nozzle and 10 ft. Suction Hose. Capacity 5 Gallons	8	10	0
No. 4a.—With Extension 5 ft. Flue, Single Spray or Nozzle and 10 ft. Suction Hose. Same capacity as No. 4 Machine	9	10	0
No. 3.—Large Machine with 5 ft. Flue, Extension Spray or Nozzle, and 10 ft. of Suction Hose. Capacity 12 Gallons	10	10	0
No. 3a.—[illegible] with wheels	11	15	0

Wells' Improved Limewash.

Much Superior to ORDINARY Limewash Slaked with Water.

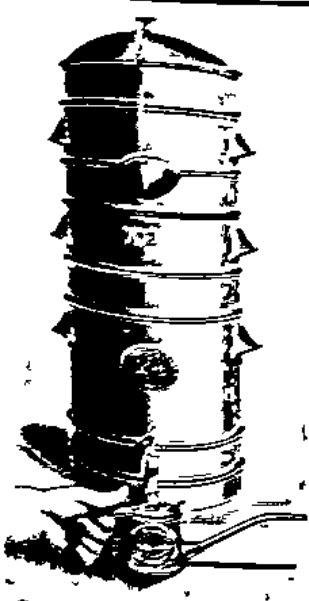
Quickly Mixed. Will not rub off. Leaves a good surface.

There has been a growing demand of late years for distemper or cold-water paints as they are termed, for use in Works, Factories and other places. Owing to the expense at which many are offered many avoid using the various makes on the market.

We have brought out a cheap form of Limewash which can be used in our Lime and Colour Washers, and which, whilst having the main advantages of the more expensive distempers, can be supplied at less than half the cost.

The material is in the form of a powder ready for mixing with water and is supplied in barrels containing 1 or 3 cwt.

Price 13 8 per cwt. Carriage Paid in England and Wales.
(If in lots of 3 cwt. at a time, 12 8 per cwt.)



PATENT Wells' "WASTE OIL" Filters

WITH SIGHT FEED SYPHONS.

Supplied to the principal Governments for the Navy, Dockyards, etc., and to the leading Electric Light Installations, Engineering Works, Gas Engine Makers, Printers, etc., etc.

Over 11,000 Sold.

Money Savers to any Users of Machinery.

Pay first cost in a short time, as Dirtied Oil, which has hitherto been thrown away, can be filtered and used again and again.

Write for List of Testimonials and Samples of Work done by the Filter

No. 1.—For users having only a small quantity of oil to treat (no Syphon) 17 in. x 9 in.		35-
No. 2.—Two Syphon Filter, holds about 3 gallons oil,	27 in. x 12 in. ..	50-
No. 3.— " " " 6 "	27 in. x 12 in. ..	70-
No. 4.— " " " 12 "	37 in. x 16 in. ..	110-
No. 5.— " " " 24 "	43 in. x 23 in. ..	183-
No. 6.—Very powerful Filter for treating large quantities of oil, 51 in. x 30 in., fitted with two steam coils		336-

Capable of dealing with some 250 Gallons Oil per week.

LARGER SIZES MADE TO ORDER.

A. C. WELLS & CO., 107a, Midland Rd., St. Pancras, **LONDON.**

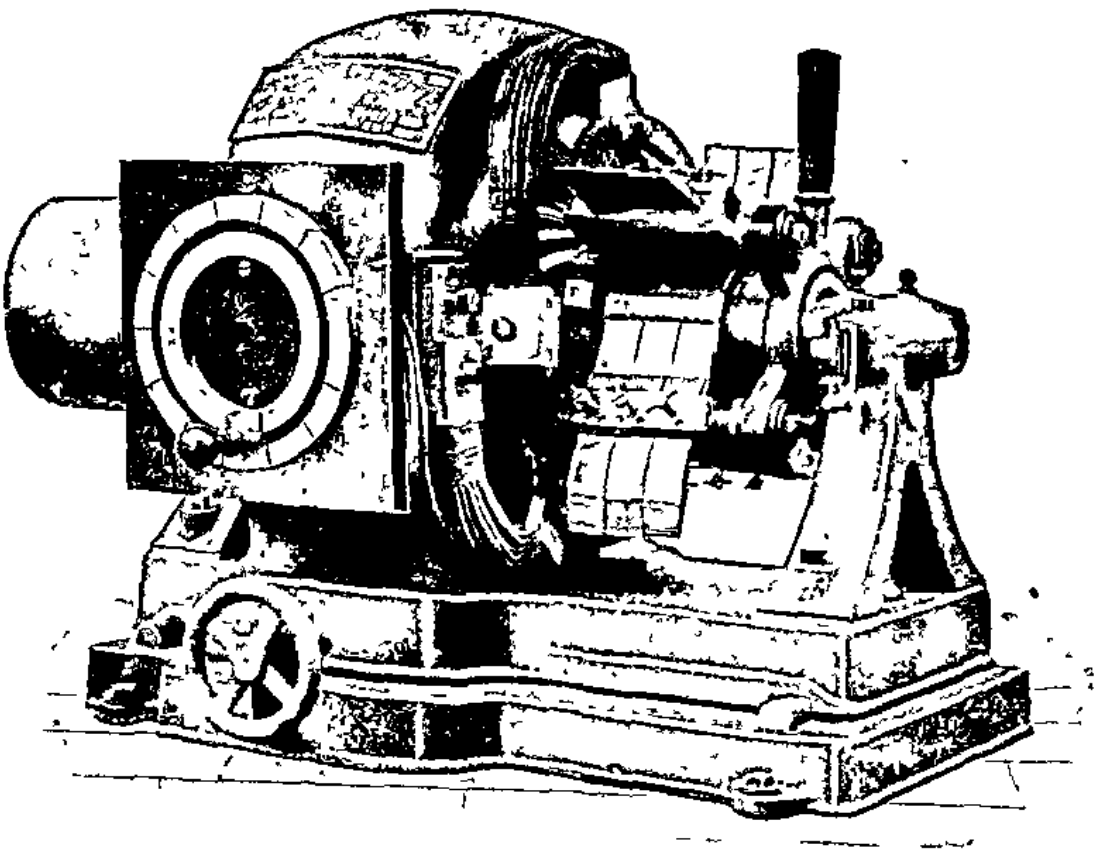
MODERN ELECTROTYPING

. MEANS .

Rapid Deposition and . . Labour-Saving Methods

IN OTHER DEPARTMENTS

It is now Possible to get good commercial shells deposited in Twenty Minutes and to finish plates right out within the Hour Let us advise you how to do it



LATEST COMPOUND WOUND RAPID DEPOSITING DYNAMO.

We Make Complete Installations or Bring Old Plants Up-to-Date.

If you are inclined to improve your battery capacity we shall be pleased to take the matter up with you, giving you the benefit of our experience, with solutions, connections, agitators, dynamos, etc.

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EMULSION

EOS

Collodion Emulsion

. for .

Three=Colour Negatives.

And for Line, Half-Tone and Orthochromatic Copying, Photographing on Wood, Ferrotype Plates and Transparency Making.

All the Leading Firms are now using this Emulsion.

New Sensitizers and Improved Methods
have been introduced, greatly simplifying the process and rendering it free from uncertainty.

The Direct Colour Process
has only been made possible by the adoption of Collodion Emulsion. The Ruled Screen and Colour Filter are now used simultaneously, reducing *all* operations to *two*, with astonishingly short exposures

Klein's Colour Screens,
are specially adapted for use with Collodion Emulsion, and with our Sensitizer C for the Blue (Red Sensation) Negative, the exposure is greatly reduced, and Three Colour Work is made at once certain and practical

General Photography
Collodion Emulsion is eminently suitable and everything that can be done by dry plates, or wet collodion can be done equally well with it

Free Demonstrations
are given Daily to purchasers in our Collodion Emulsion Laboratory by Mr. H. C. Klein, and the process is practically taught at the Polytechnic School of Photography, the L.C.C. School of Photo-Engraving and Lithography, the Battersea Polytechnic, and the Manchester Municipal School of Technology.

Send for Booklet containing Instructions and Prices.

A. W. PENROSE & CO., Ltd.,

COLOUR DEPARTMENT,
109, Farringdon Road, London, E.C.

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FEATURES.

Annealed Colourless Glass of great purity.
Correct Angle.
Perfect Optical Planeness.
Highly-polished Surfaces.
Brilliant Silvering.
Accurate Fitting.

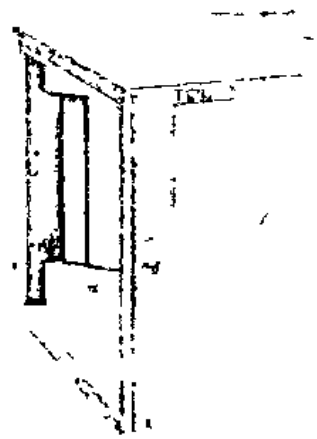
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OPTICALLY WORKED TO PERFECT PLANENESS AND BRILLIANTLY SILVE

By A NEW PROCESS.

NOTE.

We are now Silvering Mirrors on the premises by a New Process, the secret of which we have purchased. The deposit can be made very thick and is pure metallic silver, adhering tena ciously to the glass and permitting of frequent re-polishing. They are not so much affected by atmospheric influences as mirrors silvered by the old process.



A. W. PENROSE & CO., LTD., C

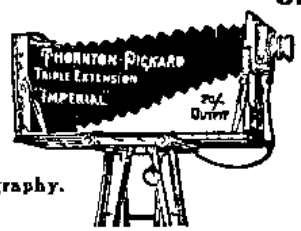
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And at New York, Paris, Berlin, Sydney and C

THORNTON-PICKARD CAMERAS and SHUTTERS

'IMPERIAL' *Triple Extension Outfit.*

For General Work, Copying, Enlarging, and Telephotography.



The Leading Low-Priced Set

A Camera Outfit of sound construction and good finish, fitted with **Real Leather Bellows.**

Spring Stretchers.—These make the erection and handling of the Camera practically automatic They are fitted to **both front and back**

Movements.—The "Imperial" has a **greater range of movements** than any other camera at a similar price, including every necessary adjustment

SPECIFICATION.

Triple Extension Camera—Behind Lens Time and Instantaneous Shutter with Speed Indicator, Three-fold Ash Tripod Stand, Double Book form Dark Slide, Beck Symmetrical Lens with Iris Diaphragm

HALF-PLATE SIZE 70/-

Made in all Sizes, ¼-plate to ½-plate.

'SPECIAL RUBY'

A High-class Outfit at a Low Price.

A Desirable Outfit of remarkable Value.



Of Best Workmanship and Finish Throughout.

The Camera is fitted with every necessary movement, and is thoroughly efficient in every respect.

SPECIFICATION.

'Special Ruby' Camera Brass turntable, 3 fold Stand, Time and Instantaneous Shutter, Double Book form Dark Slide, and Beck Rapid Symmetrical Lens, F/8, Half-plate,

£5 : 5 : 0

Made in all Sizes, ¼-plate to 10 × 8.

Illustrated Catalogue Post-Free.

Thornton-Pickard Co., Ltd., Altrincham.

The COOKE Process Lens

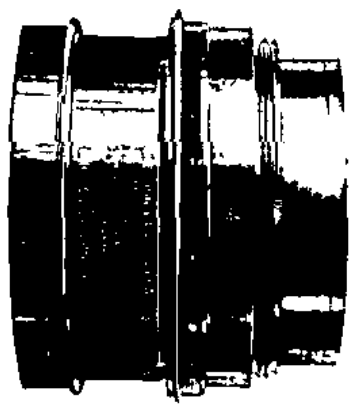
IS ACKNOWLEDGED BY ALL TO BE

The Best All-round Lens

FOR PROCESS COPYING in

Zinc, Half-Tone or Three-Colour.

USED BY ALL THE LEADING PROCESS WORKERS THROUGHOUT THE WORLD.

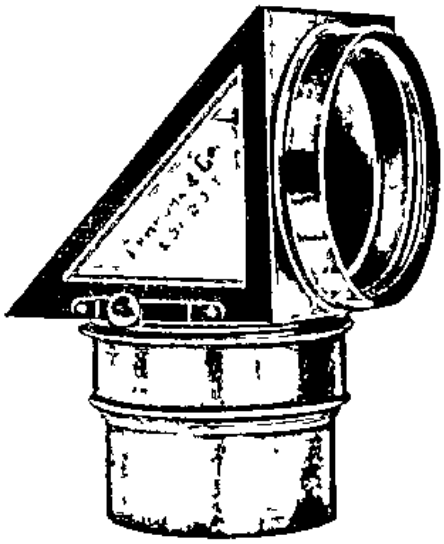


It covers ALL the Plate.

MANUFACTURED EXCLUSIVELY FOR

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THE PENROSE Prisms.



FEATURES.

Annealed Colourless Glass of great purity.
Correct Angle.
Perfect Optical Planeness.
Highly-polished Surfaces.
Brilliant Silvering.
Accurate Fitting.

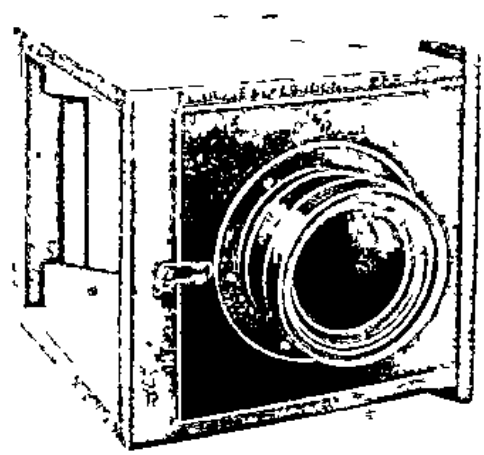
Mirrors

OPTICALLY WORKED TO PERFECT PLANENESS AND BRILLIANTLY SILVERED

By A NEW PROCESS.

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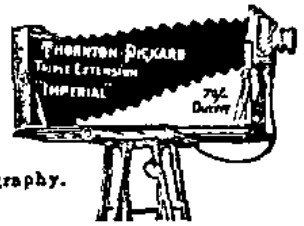


A. W. PENROSE & CO., LTD., OPTICAL DEPARTMENT,
109, Farringdon Road, LONDON, E.C.
And at New York, Paris, Berlin, Sydney and Capetown.

THORNTON-PICKARD CAMERAS and SHUTTERS

'IMPERIAL' *Triple Extension Outfit.*

For General Work, Copying, Enlarging, and Telephotography.



The Leading Low-Priced Set.

A Camera Outfit of sound construction and good finish, fitted with **Real Leather Bellows.**

Spring Stretchers.—These make the erection and handling of the Camera practically automatic They are fitted to **both front and back**

Movements.—The 'Imperial' has **a greater range of movements** than any other camera at a similar price, including every necessary adjustment.

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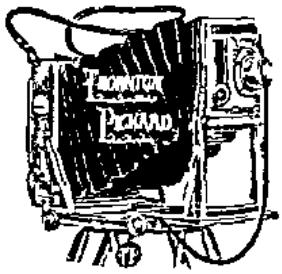
HALF-PLATE SIZE 70/-

Made in all Sizes, ¼-plate to ½-plate.

'SPECIAL RUBY'

A High-class Outfit at a Low Price.

A Desirable Outfit of remarkable Value.



Off Best Workmanship and Finish Throughout.

The Camera is fitted with every necessary movement, and is thoroughly efficient in every respect.

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Made in all Sizes, ¼-plate to 10×8.

Illustrated Catalogue Post Free

Thornton-Pickard Co., Ltd., Altrincham.

The COOKE Process Lens

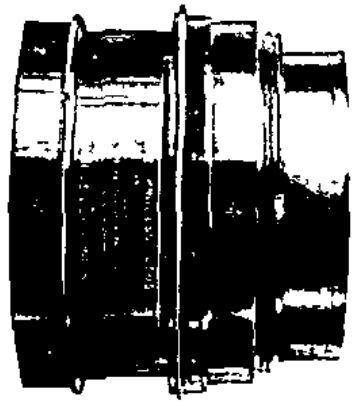
IS ACKNOWLEDGED BY ALL TO BE

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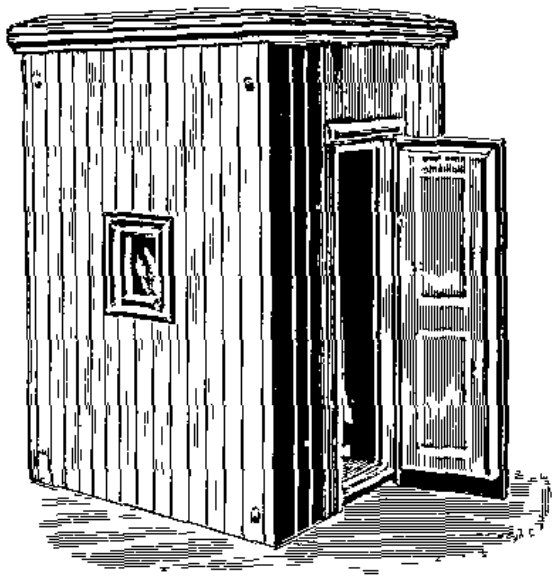
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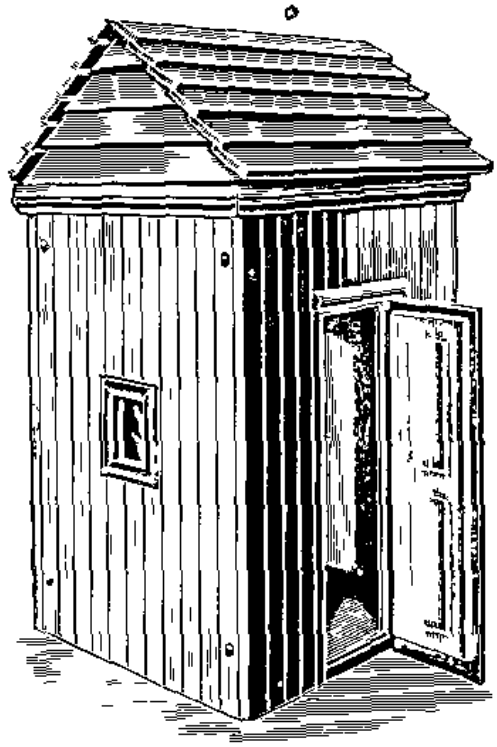


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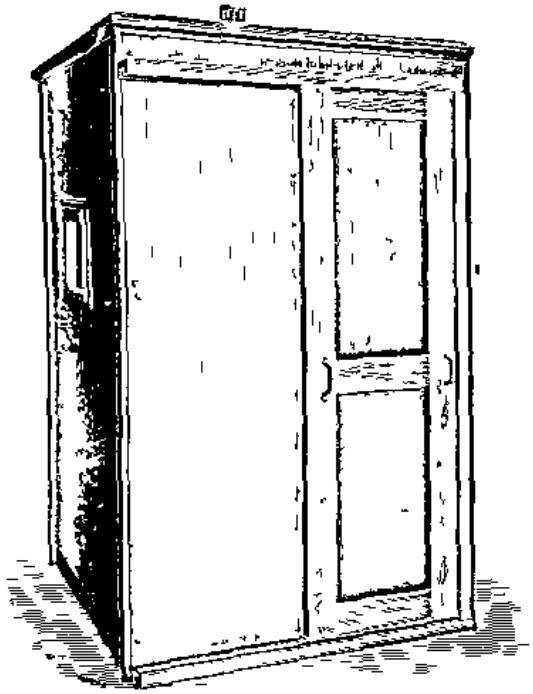
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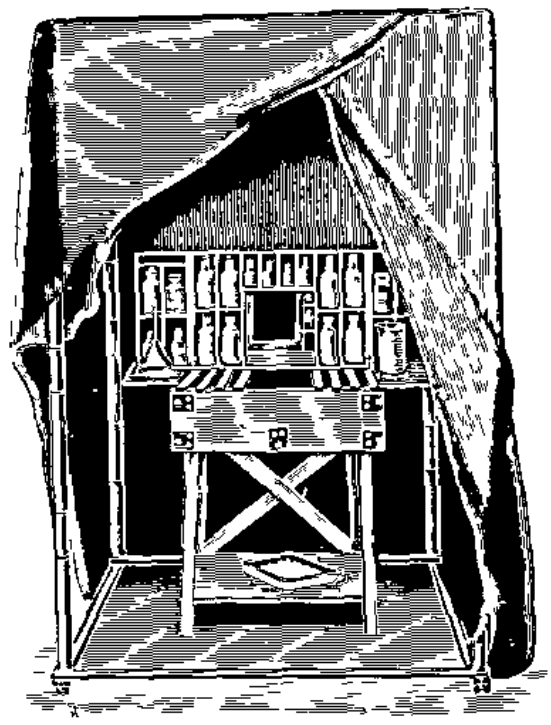
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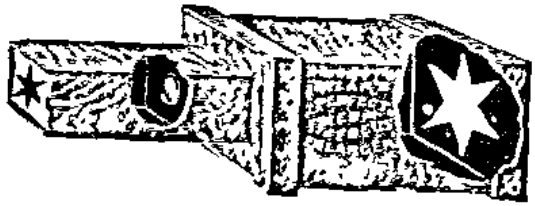
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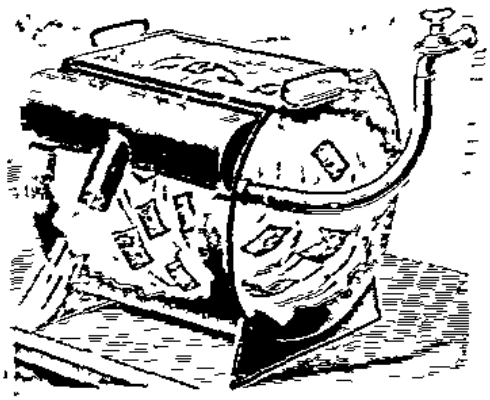
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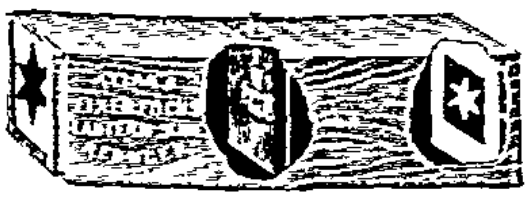
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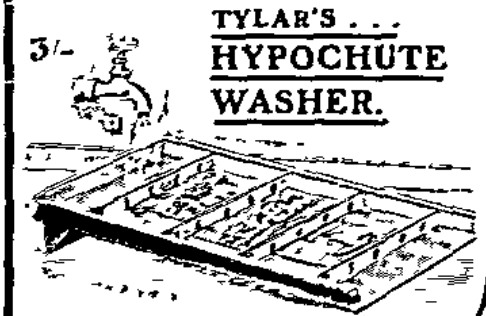
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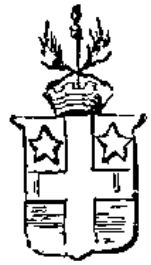
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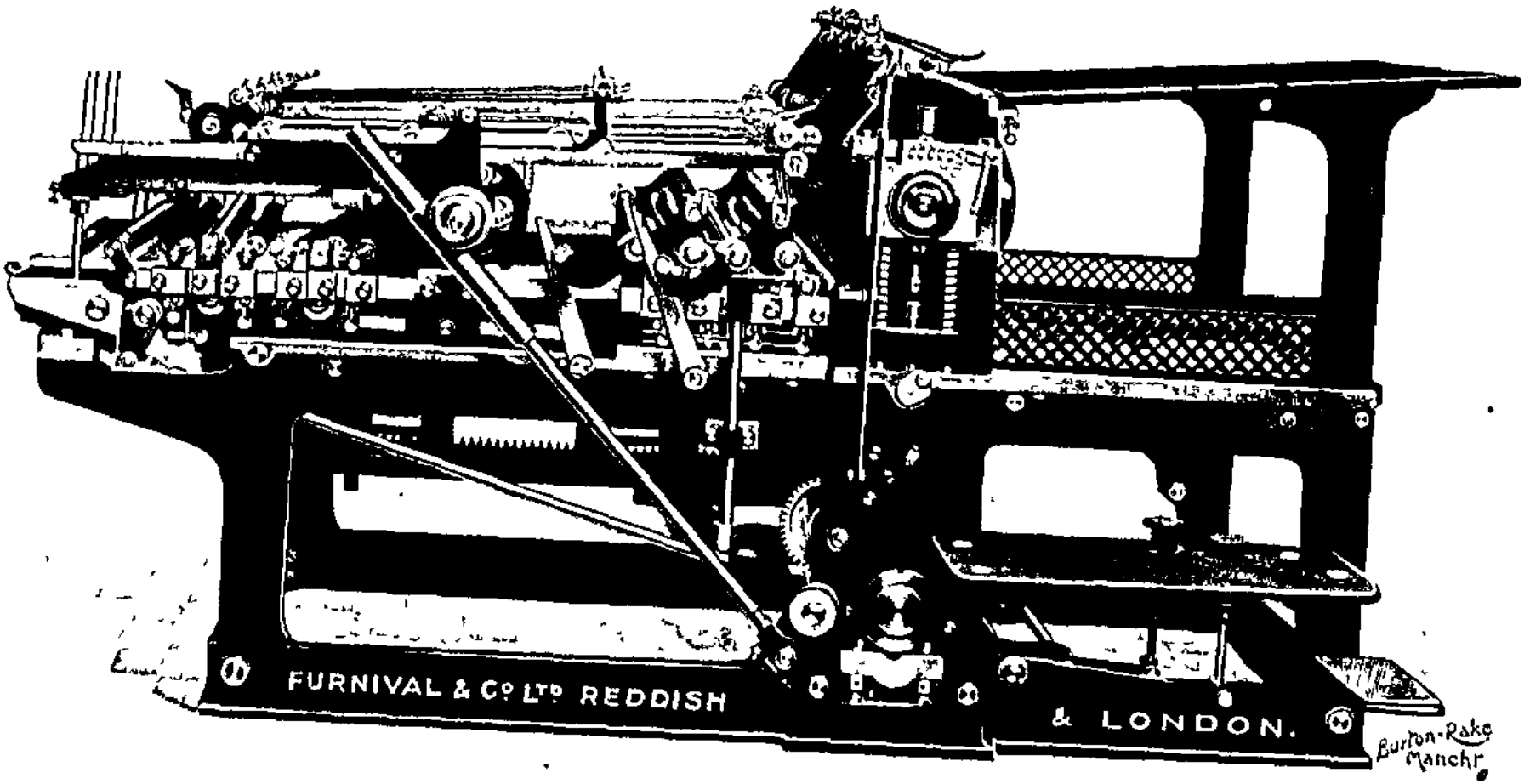
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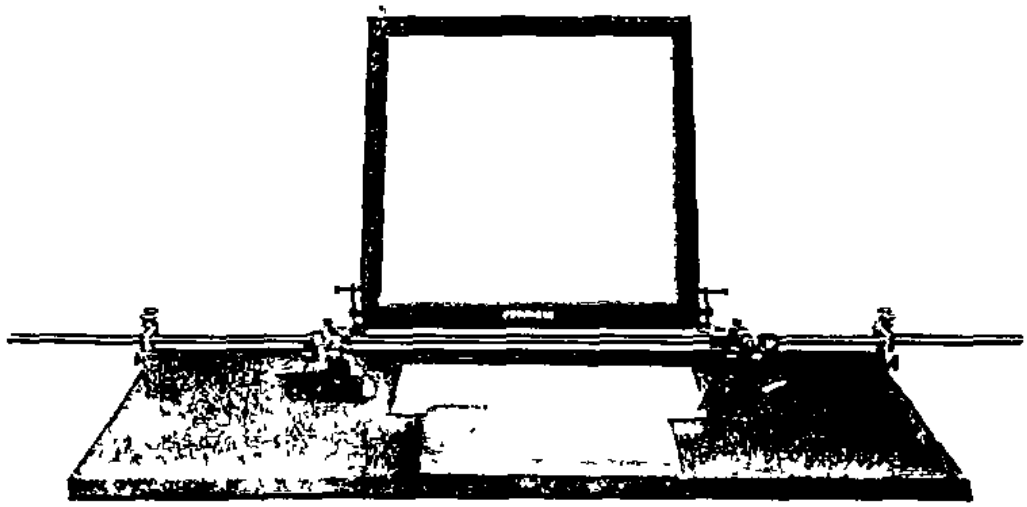
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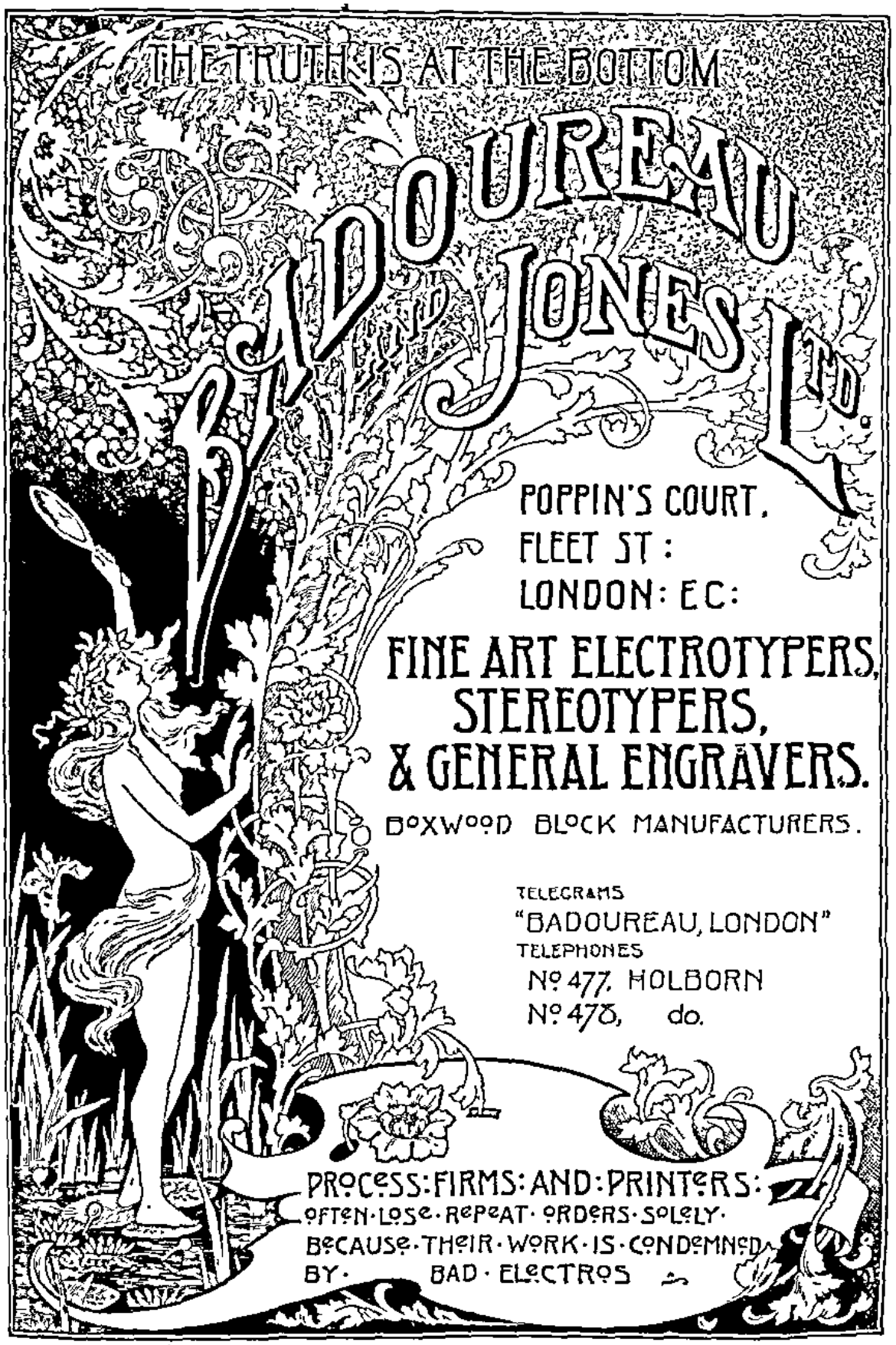
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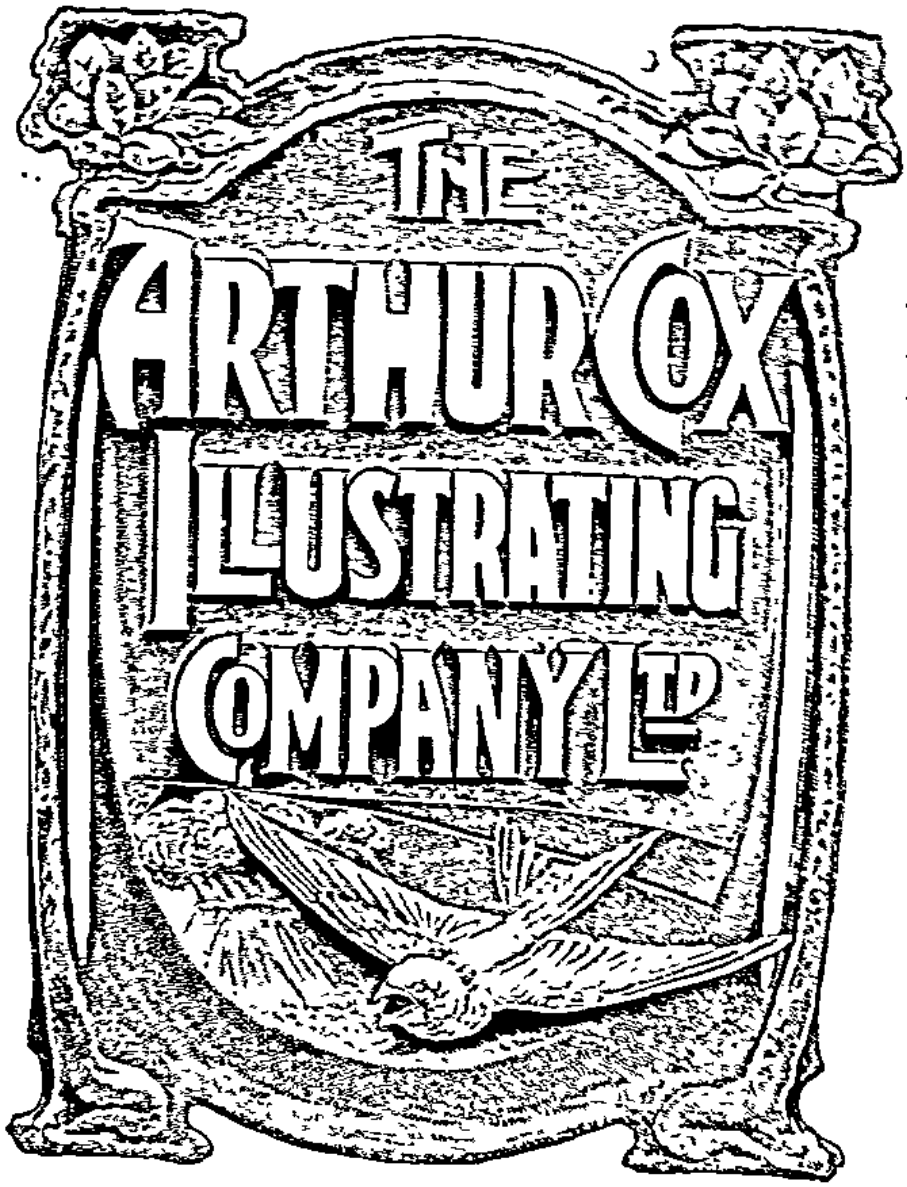
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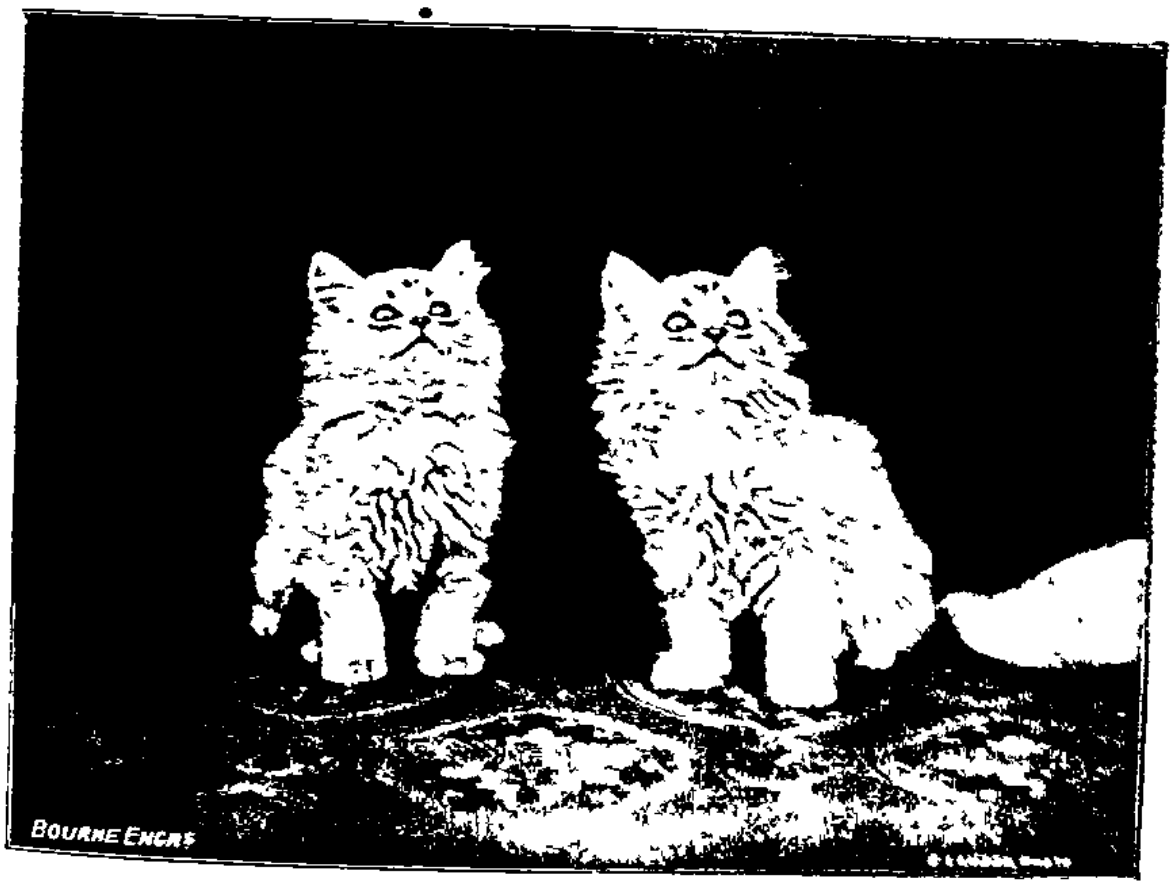
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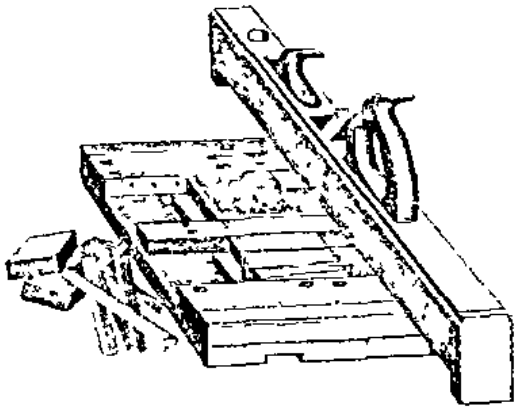
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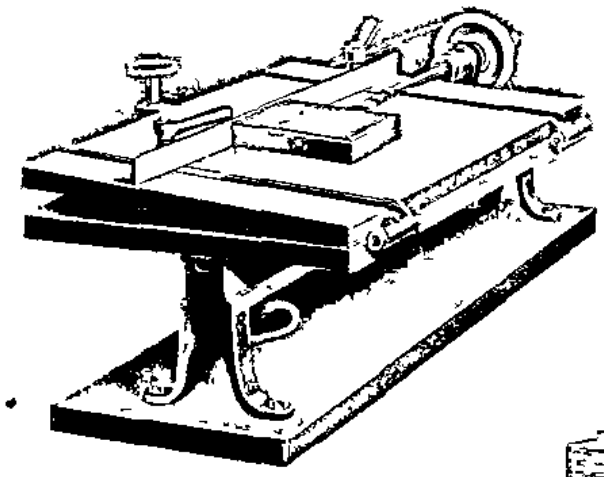
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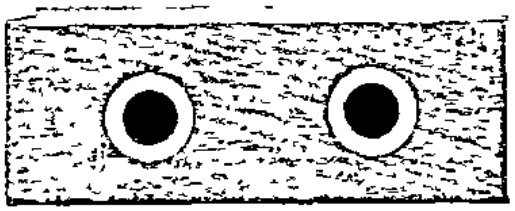


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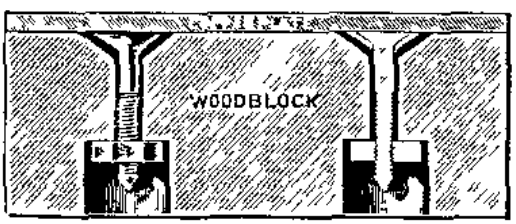
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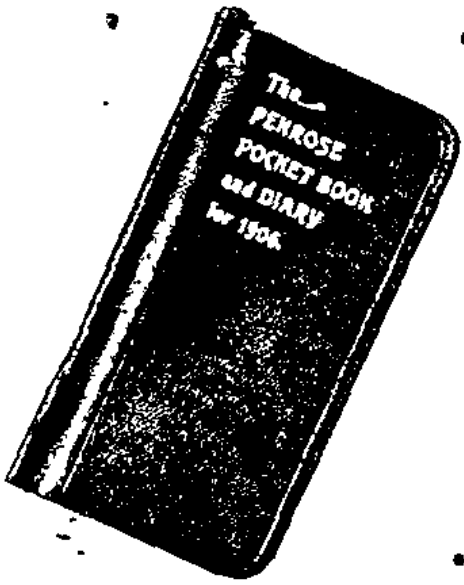
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